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EVALUATION OF FISH RESOURCES OF
THE MACKENZIE RIVER VALLEY
VOLUME II
1973



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AN EVALUATION OF THE FISH RESOURCES OF THE MACKENZIE
RIVER VALLEY AS RELATED TO PIPELINE DEVELOPMENT

Volume II

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Fisheries Service
Department of the Environment

for the

Environmental-Social Program
Northern Pipelines

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Les données de ce rapport sont le fruit de recherche menées dans le cadre du programme écologique et social des pipe-lines du Nord, par le groupe fédéral de travail affecté à l'exploitation du pétrole dans le Nord.

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3. INTRODUCTION

In an effort to provide a thorough survey of the fish resources of the Mackenzie River system, Fisheries Service operations were conducted in 1971 from three Mackenzie River base camps; Fort Simpson, Norman Wells and Arctic Red River. Since many of the major Mackenzie River tributaries were still beyond easy access of any base camp, a synoptic helicopter survey was initiated to assess the fish resources of these streams and also the upper reaches of rivers within reach of the base camps.

The survey consisted of establishing and operating stream sampling locations with the primary objective of defining the fish species composition and possible nursery or spawning areas. The results of the 1971 program can be found in complete form in Interim Report I, Volume 2 (Hatfield et al., 1972).

In 1972, the addition of a new base camp at Aklavik justified an expansion of the synoptic survey into the Mackenzie Delta and Yukon border areas. A limited delta lake survey was also included. An intensive gill netting effort was conducted on the Great Bear River system in late September and early October. Helicopter time was also used to assist base crews in establishing overnight camps on remote lakes such as Swan Lake and Three Day Lake.

A major addition to the 1972 synoptic study was a stream-by-stream engineering analysis of riverbank stability with respect to potential stream crossings by either pipeline or highway. This evaluation was conducted during the spring survey and included all synoptic study tributaries.

Efforts were made to include as many Mackenzie River tributaries as possible. However, for reasons outlined below, some streams had to be omitted.

a) Streams not included during the 1971 or 1972 surveys

Such omissions were based primarily on criteria such as stream discharge at the time of survey and accessibility of the streams for establishment of sampling stations.

b) Streams surveyed during 1971 but omitted in 1972

Ice and flood conditions during the 1972 survey were mainly responsible for the above omissions. Several 1971 survey rivers were also assigned to base camp surveys in 1972. Based on the 1971 results some streams were omitted because they seemed to be lacking in fish production potential, e.g. extensive beaver activity.

3. INTRODUCTION Cont'd.

c) Streams surveyed during 1972 only

The primary reason for stream additions was the extension of the synoptic boundaries into the Mackenzie Delta.

4. METHODS AND MATERIALS

4.1 Sampling Locations

4.1.1 Seining Locations

On the larger tributaries of the Mackenzie River, two seining locations were normally selected. The first station was generally located near the river mouth and the second location was further upstream.

On smaller tributaries, only one sampling station was established, slightly upstream of the river mouth.

The selection of seining locations was based on the following criteria:

- a) flow conditions (depth, velocity),
- b) accessibility of site by helicopter,
- c) previous knowledge of the area.

4.1.2 Gill Netting Locations

For the most part, gill net stations were located at the confluence of a tributary mouth and the Mackenzie River, where Mackenzie River backwater formed areas of quiet water. Stations further upstream were located in backeddies formed by secondary tributaries flowing into the main tributary. Lake sets were positioned near the lake outlet or inlet if possible. Conditions sometimes made such sets impossible and bay areas had to be used.

4.2 Sampling Techniques and Catch Analysis

For seining operations a 30-foot beach seine was used in all instances. Gill net sets consisted of 60-foot gangs comprising six 10-foot sections of each mesh size, or a 25-yard gill net of three-inch or four-inch mesh (Hatfield et al., Vol. 2, 1972).

Gill nets were set from a small rubber raft or from the helicopter pontoon.

Fish caught in gill nets were weighed to the nearest gram (g) and measured to the nearest millimeter (mm). Scale samples were removed and stored in scale envelopes for later age determination. In situ stomach analysis was conducted and records were kept of the sex and stage of maturity of each fish.

Large fish taken during seining operations were analysed in the same way as gill net catches. Small fish were placed in preservative (ten per cent formalin) for future laboratory identification and analysis.

Hach water analysis kits were used to determine pH, dissolved oxygen, alkalinity, and hardness levels. Temperatures were measured by means of a pocket thermometer.

4.3 Engineering Evaluation of Rivers and Riverbanks

The purpose of this study was to gain insight into riverbank conditions, with the aim of assessing the significance of riverbank stability with respect to future engineering activities and the effects that such activities might have on fish.

This report is not intended to document the many possible side effects of northern construction on fish. Discussion of these aspects can be found in Report #1 (Stein *et al.*., 1973). It will deal mainly with two aspects of construction and their relation to riverbank stability. These aspects are described below.

a) Siltation of streams

Construction activities on stream approaches, such as trenching, clearing and vehicle movement over permafrost areas, can result in a dangerous level of silt and debris being added to a watercourse. Post-construction erosion leading to siltation may also result from alteration of the ground's thermal regime during pipeline operation. The extent of siltation in both these cases is related to factors such as riverbank shape (slope, height), vegetation, soil material and ice content of the soil. Trenching within the riverbed may also add a considerable amount of sediment to a river. The controlling factors in this case are: streambed material, stream depth and stream velocity.

All the above mentioned variables are dealt with in this report and may be related to possible influences on aquatic life.

b) Pipeline Rupture

Riverbank failures, if extensive enough, may result in a lack of support for sections of pipeline approaching or crossing a stream (Fig. 2). The resulting rupture could have disastrous effect on fish.

This report lists many of the major unstable areas of the Mackenzie Valley and the types of failures observed.

4.3.1 Field Observations

Classification of riverbank stability was accomplished from approximately 100 feet above ground and at an air speed of from 30-50 m.p.h. Field observations were marked directly on to 1:250,000 maps.

4.3.1 Field Observations Cont'd.

Observations included:

- a) type or types of failure occurring on riverbank,
- b) slope angles of beach and riverbank which were measured (Abney Hand Level) if possible or estimated,
- c) estimate of slope heights,
- d) stream gauging measurements,
- e) photographs of representative sections.

Also marked on the maps were sampling locations, known and suspected spawning areas, stream blockages (Fig. 6), surrounding vegetation, burn areas, etc.

4.3.2 Riverbank Classification

The classification system outlined below is patterned after the system employed on a small section of the Mackenzie River main stem (Isaacs and Code, 1971). Because of the great difference in the type of riverbanks being investigated Mackenzie River as opposed to small tributaries) minor alterations to this system were made.

Classification is divided into two groups; these being 'R' group and 'S' group. 'R' refers to rock and 'S' refers to soil. In each group the classification is listed in order of increasing danger to the fish resource i.e. R_2 is potentially more unstable than R_1 and S_3 is potentially more unstable than S_1 .

S_3 regions are of greater concern than S_2 regions because of greater chance of pipeline rupture.

R_1 - Predominantly carbonates, sandstone, some shale; forms steep, relatively stable valley walls and ledges; weathering enlarges joint planes, rock-falls occur as rock breaks into fragments defined by joints and bedding planes (Fig. 7).

R_2 - Predominantly shale; slope failures in weathered active layer, usually gullied, susceptible to large scale slumping.

S₁ - Soil Slope: Stable

Low angle slopes, generally 15°, no failure observed, well vegetated. Typical river would be one which crosses a wide, inactive (heavy spruce growth) flood plain, has low, well vegetated banks, little meander, level or gently rolling surroundings with a heavy tree growth (Fig. 10).

S₂ - Soil Slope: Active Layer Failing

Slope angles range from 15°-40° in non-burn areas. Failures are confined to active layer and include slope failures, infinite slope failure solifluction, creep, dry sand runs and mud (flow) slides. Also included in this classification are regions of very active meander containing stream channel cut-offs, oxbow lakes (Fig. 3) and undercut banks. Very marshy or swamp areas are included.

S₃ - Soil Slope: Large Scale Slumping

Large scale rotational or translational movement, usually base failures, accompanied by large scale gullying. In permafrost regions, failure planes pass through the active layer and the frozen layer and possibly exit in unfrozen layer below permafrost. This type of slide spreads by lateral regression as a series of slump blocks which can be hundreds of feet wide. Also included in this classification are high, steep banks (slopes 40°) which display a potential for failure (Fig. 4).

Permafrost or ice veins were noted when encountered, but no special effort was made to locate such phenomena.

Burn areas and their effect on erosion were also noted.

4.3.3 Failure Types

Numerous types of riverbank failures have been described in the above classification. These failures can be described using terminology common in landslide analysis. Two groups, 'earth flows' and 'land slides' are involved.

4.3.3 Failure Types Cont'd

A. Earth Flows

Earth flows are characteristically composed of fine textured sediment. Examples of some types of earth flows are:

Solifluction: The term solifluction is applied to the slow downslope movement of wet, soupy soils under the action of gravity. Solifluction is characteristic of high latitude regions of permafrost. Because of the frozen subsoil condition, the surface layers become water soaked during the summer months and begin a gradual downslope movement even on very gentle grades.

Creep: Creep resembles solifluction. The distinction is in the water content of the soil; creep does not rely on a saturated condition. One of the principal causes of creep is the uplifting force of frost. Particles are raised normal to the ground surface during winter and lowered again during spring. This freezing and melting process gradually moves material downslope. Railway tracks, pipelines or highways may be thrown out of line and damaged by creep.

Rapid Flows (Mud Flows): Rapid flows differ from creep and solifluction because of a greater depth of soil movement and a much faster rate of movement. The finer textured soils, especially those containing a high clay content, are most often associated with this type of failure. Once movement is started, wet clay becomes very plastic and flows readily on very gentle slopes.

Burn Areas: In burn areas, slopes fail on relatively low inclines, such as 5° - 10° . This is a result of the destruction of the insulating organic cover. Without this organic cover, solar radiation increases the depth of the active layer. In addition, the unburnt organic cover provided cohesion to the soils at the ground surface, adding to their natural stability. The newly thawed soil, having a low shear strength, tends to move downslope, carrying the dead organic cover along. (Fig. 5).

3.3 Failure Types Cont'd

B. Landslides

Slump: The term slump is applied to large masses of bedrock or overburden that slide downward from a cliff, at the same time rotating backward on a horizontal axis. Slumping commonly occurs wherever weak overburden such as flood plain alluvium or glacial deposit has its supporting base removed. Hence it is seen in regions of high riverbanks with undercut bases (Fig. 8),

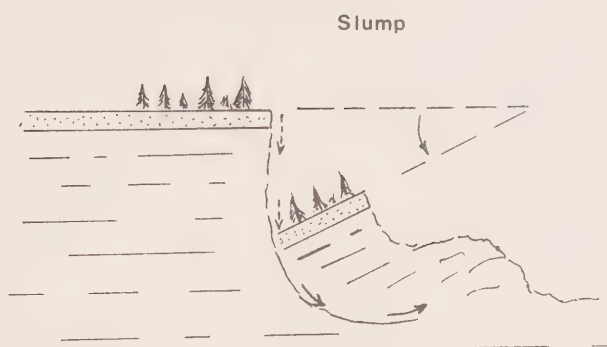


Fig. 1 Slump Mechanics

Rockfall: Most rapid of all mass wasting processes is 'rockfall'; the free falling or rolling of large blocks of rock from steep cliffs. Rockfalls are common in river gorges. Spring and fall are theseasons of most danger. This type of failure poses a great threat to bridge or suspended pipeline supports.

Undercut Riverbanks: Actively meandering rivers will scour out the base of a riverbank, leaving the upper portion of the bank (vegetation mat binds material together) overhanging the river (Fig. 2) Eventually this overhang will drop into the river and carry with it a sudden surge of debris, which may cause problems at downstream structures (Fig. 9).

4.3.4. Stream Measurements

Stream cross-sections and discharges were taken as often as possible. Originally it had been intended to

4.3.4. Stream Measurements Cont'd

use a current meter for measuring stream velocities and discharge. Suitable equipment was however, unavailable for the field season and stream gauging had to rely on surface velocity measurements. Surface velocities were determined by timing a floating object through a known distance. A reduction factor of .85 was applied to compensate for surface velocity being greater than mean velocity.

Where possible, depth soundings and surface velocity measurements were taken by wading across the stream. Many streams visited were not cross-sectioned due to fast water or excessive depth. On such occasions an estimate of width and sometimes velocity was made.

Stream discharge (cubic feet per second) was determined from wetted area and stream velocity.

Although the accuracy of the stream measurements was limited, it should be understood that the purpose of this stream survey rules out the need for great accuracy. Discharge figures are intended as a rough estimate of river size and flow conditions at a specific time of year. Thus, a rough comparison can be developed between rivers.



Fig. 2 Deeply undercut riverbank with extensive vegetation mat overhang.

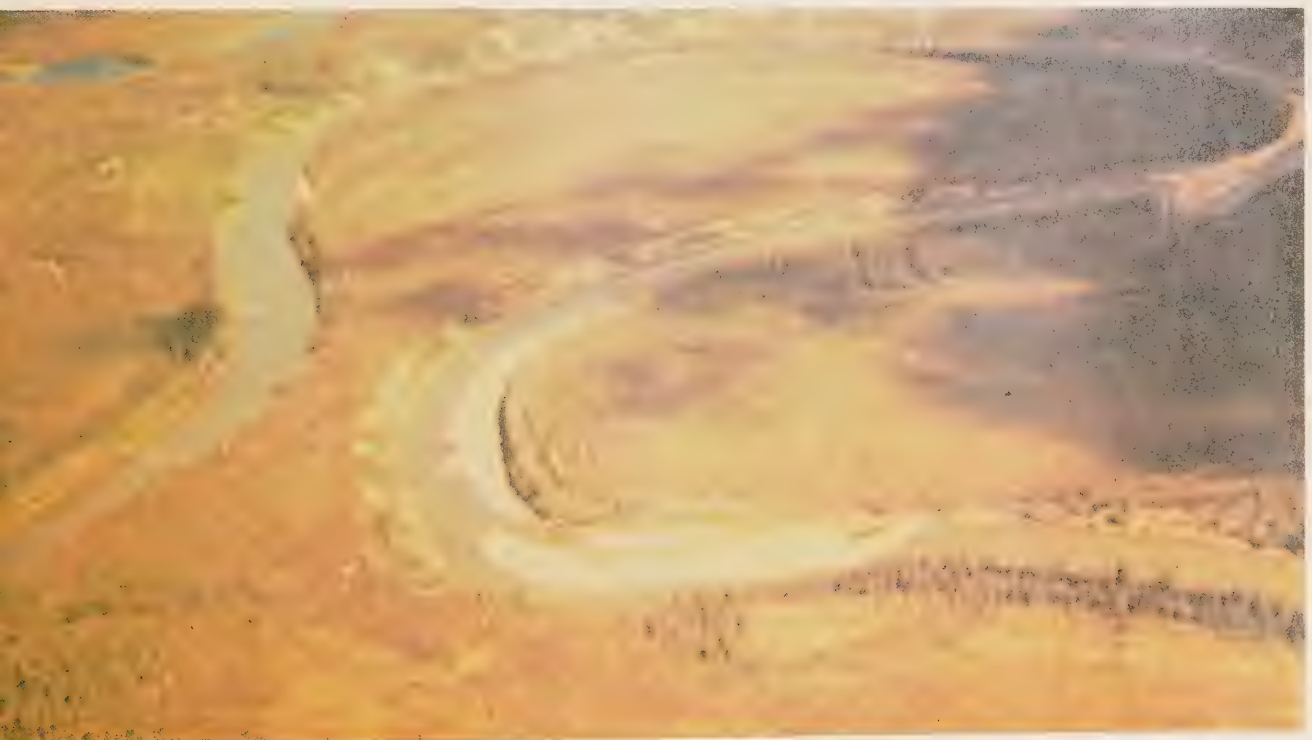


Fig. 3 Large meander loop. An oxbow lake will result when the river channels eventually meet (termed a cut-off) and seal off the meander loop.



Fig.4 Steep, exposed clay bank. Failures include undercutting, tree falls, gullying and mud slides. Siltation of water is evident. Region would be classified as S₃.



Fig.5 Riverbank erosion resulting from the vegetation mat being destroyed by fire.



Fig. 6 Stream impassable to fish. Many beaver dams in the background, plus what appears to be the remains of an old winter road in the foreground.



Fig. 7 Rock cliffs showing little evidence of fracture or weathering. Would be classified as R_1 .



Fig. 8 High-water damage. Failures include undercutting and minor slumping.



Fig. 9 Riverbank collapse resulting from undercut. The leaning trees are sometimes referred to as "drunken trees."



Fig. 10 Stable crossing area, S_1 condition.



Fig.11 Rip rap material for the protection (from water damage) of stream crossing structures. This size of rock will be in much demand.

4.4. Limitation of Methods

The extent of the study area and the large number of streams to be investigated were significant problems encountered by the synoptic survey, posing mainly timing and logistics difficulties. Factors such as flooding, ice movement and poor weather hampered the timing and effectiveness of sampling. Logistics generally permitted only one spring and one fall sampling per location. If spring river conditions rendered sampling impractical or ineffective, a location was often not sampled until fall. A reduction in the size of the study area or the number of streams to be surveyed would result in a more intensive and more accurate survey.

Limitations of gill nets and beach seines were similar to those encountered by the river bases. (Stein et al, 1973).

5. TRIBUTARY DATA

The numbers, species and distribution of fish caught by the synoptic crew are presented in the following series of maps and tables. A description of each tributary and an evaluation of its river banks is included for all but the first seven tributaries plus those of the Liard River. The former were not analysed for bank stability because they occur within the area assigned to the new base camp at Aklavik. Within this area, a greater emphasis was placed on establishing sampling stations on a general investigation rather than on a disciplined study of specific rivers. Figure 12 locates all the rivers survey by the synoptic crew during 1972. The accompanying legend relates the map numbers to river names.

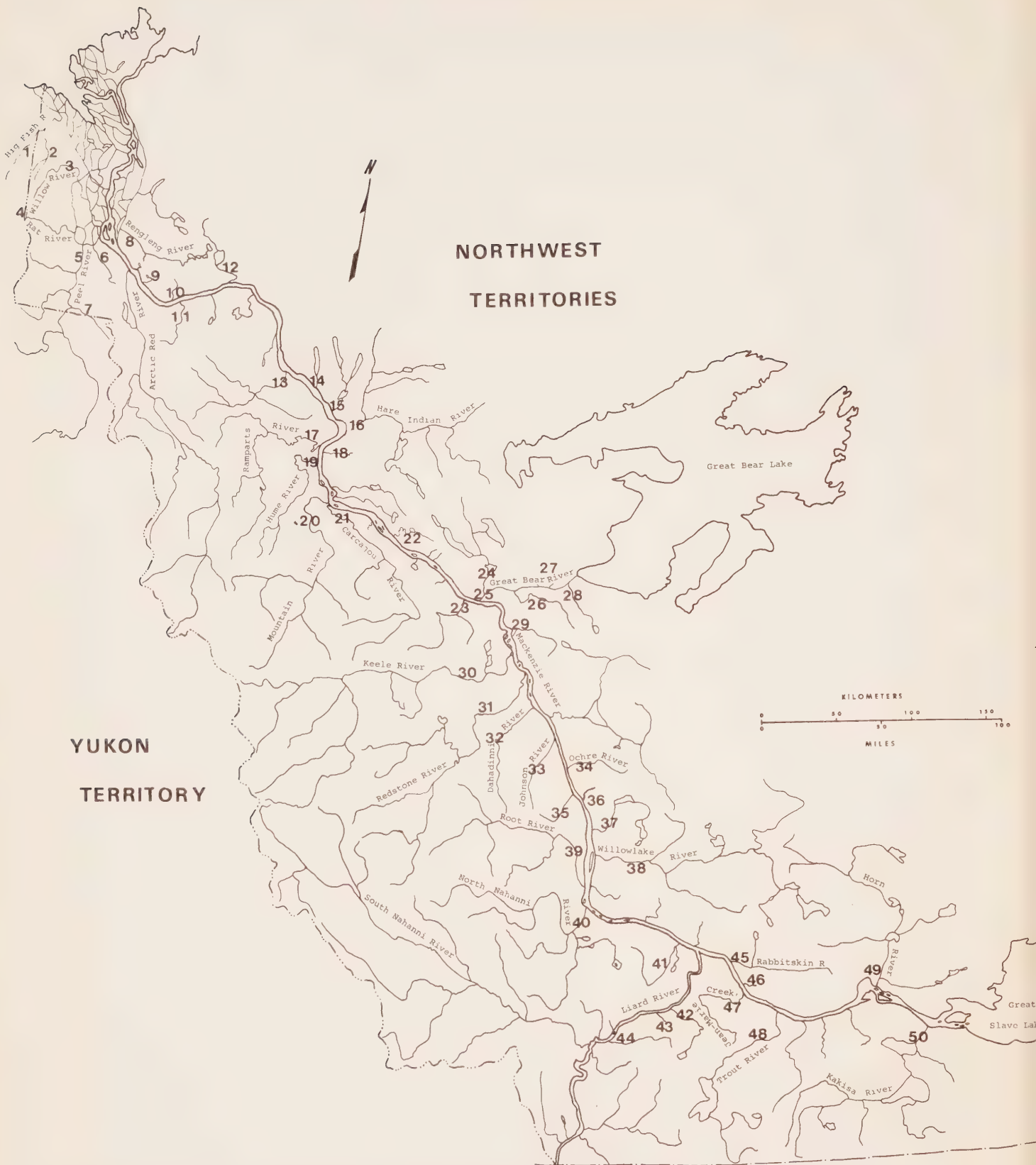


Fig. 12 Map of Mackenzie River locating the synoptic study rivers.

Legend

- | | |
|-----------------------|---------------------------------|
| 1. Big Fish River | 26. St. Charles Creek |
| 2. Cache Creek | 27. Stick Creek |
| 3. Willow River | 28. Porcupine River |
| 4. Fish Creek | 29. Big Smith Creek |
| 5. Peel River | 30. Keele River |
| 6. Frog Creek | 31. Redstone River |
| 7. Satah River | 32. Dahadinni River |
| 8. Rengleng River | 33. Johnson River |
| 9. Pierre Creek | 34. Ochre River |
| 10. Rabbit Hay River | 35. Wrigley River |
| 11. Tree River | 36. Hodgson Creek |
| 12. Travaillant River | 37. River between two Mountains |
| 13. Ontaratue River | 38. Willowlake River |
| 14. Tieda River | 39. Root River |
| 15. Loon River | 40. North Nahanni River |
| 16. Hare Indian River | 41. Martin River |
| 17. Ramparts River | 42. Poplar River |
| 18. Tsintu River | 43. Birch River |
| 19. Hume River | 44. Blackstone River |
| 20. Mountain River | 45. Rabbitskin River |
| 21. Carcajou River | 46. Spence River |
| 22. Oscar Creek | 47. Jean-Marie Creek |
| 23. Little Bear River | 48. Trout River |
| 24. Brackett River | 49. Horn River |
| 25. Great Bear River | 50. Kakisa River |

BIG FISH RIVER and
CACHE CREEK

Y.T.

N.W.T.

Moose

Channel

many lakes and channels
limit Mackenzie R. Delta

Big Fish

Fish River

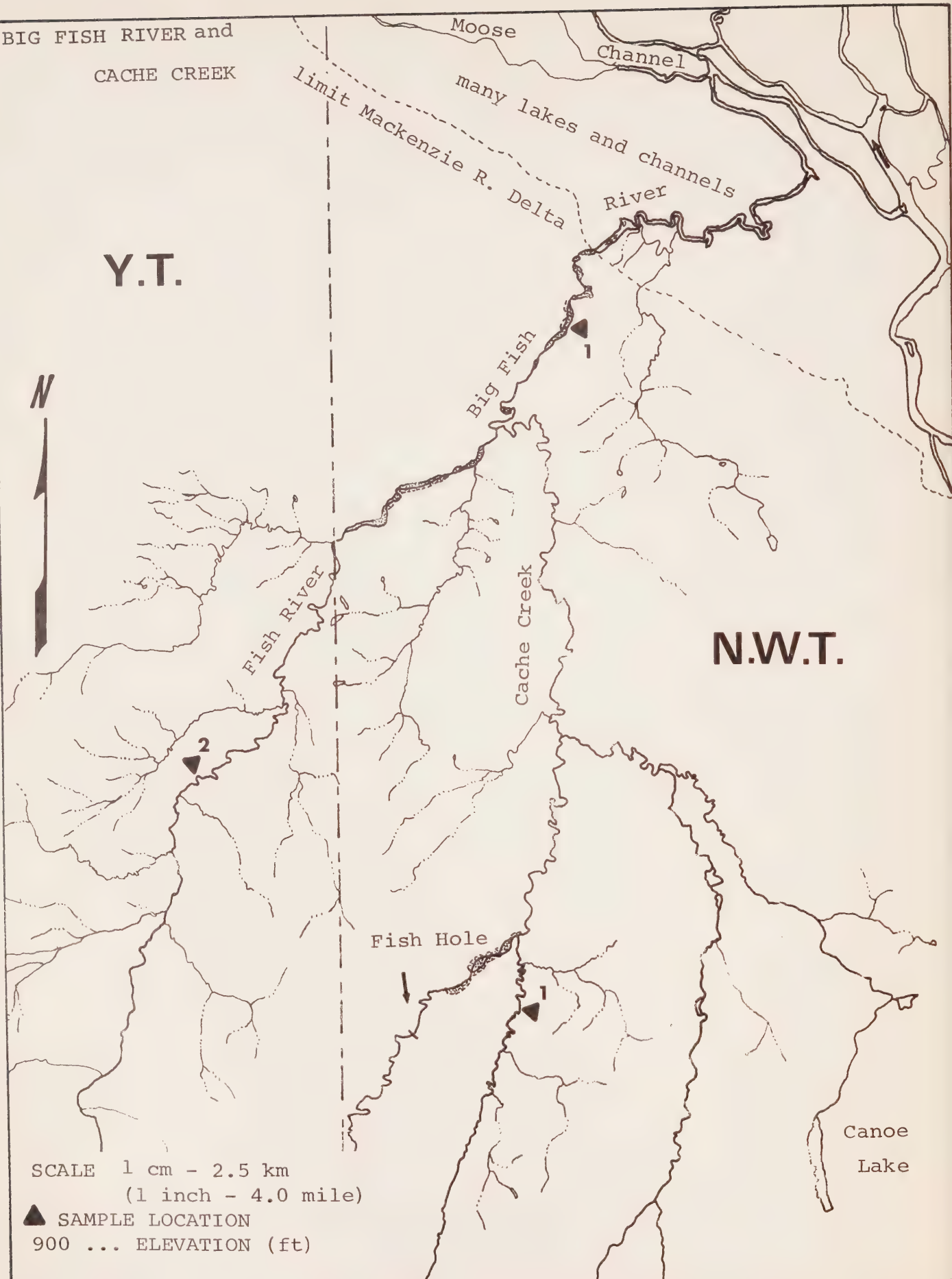
Cache Creek

Fish Hole

Canoe
Lake

SCALE 1 cm - 2.5 km
(1 inch - 4.0 mile)

▲ SAMPLE LOCATION
900 ... ELEVATION (ft)



BIG FISH RIVER

Total length 68 miles; drainage area not available.

Watercourse Type

Fish River originates in the Richardson Mountains. The upper reaches are incised in a steep-walled gorge while the lower reaches meander along a wide valley bottom. The water is generally clear throughout the year. Gravel is the predominant river bed material.

CACHE CREEK

Total length 48 miles; drainage area not available.

Watercourse Type

This creek flows through a wide valley cut through a hilly terrain. The water remains clear throughout most of the year and flows over extensive gravel areas.

Riverbank Conditions

Not assessed. (see Sec. 5)

Assessment of the Fish Resources

Based on tagging and sampling information collected during the 1972 field season, the Big Fish River was found to be an important stream for Arctic char. At least one form of the population is present in the river system throughout the year. Char tagged in the delta section of the river during mid-August were observed to reach "Fish Hole" on Cache Creek, (a tributary of the Big Fish River) during September. Mature males and females in spawning colours were observed in this spawning area. Large numbers of fingerling char were seined from the multi-channelled gravel flats a few miles downstream. Immature char about one foot long were observed to accompany the mature fish on their migration from the sea, presumably to overwinter in the area.

Indians and Eskimos of the Aklavik area have utilized this char run for years. At present char are fished by gill net at the river mouth and by seine net at the spawning grounds of "Fish Hole".

A resident population of Arctic grayling was also observed at "Fish Hole" and in the upper reaches of Fish River. Most adult grayling were small (under 300 mm.). Grayling fingerlings were seined from the pools and riffles at various locations along the river system.

Sample Location Data: Big Fish River

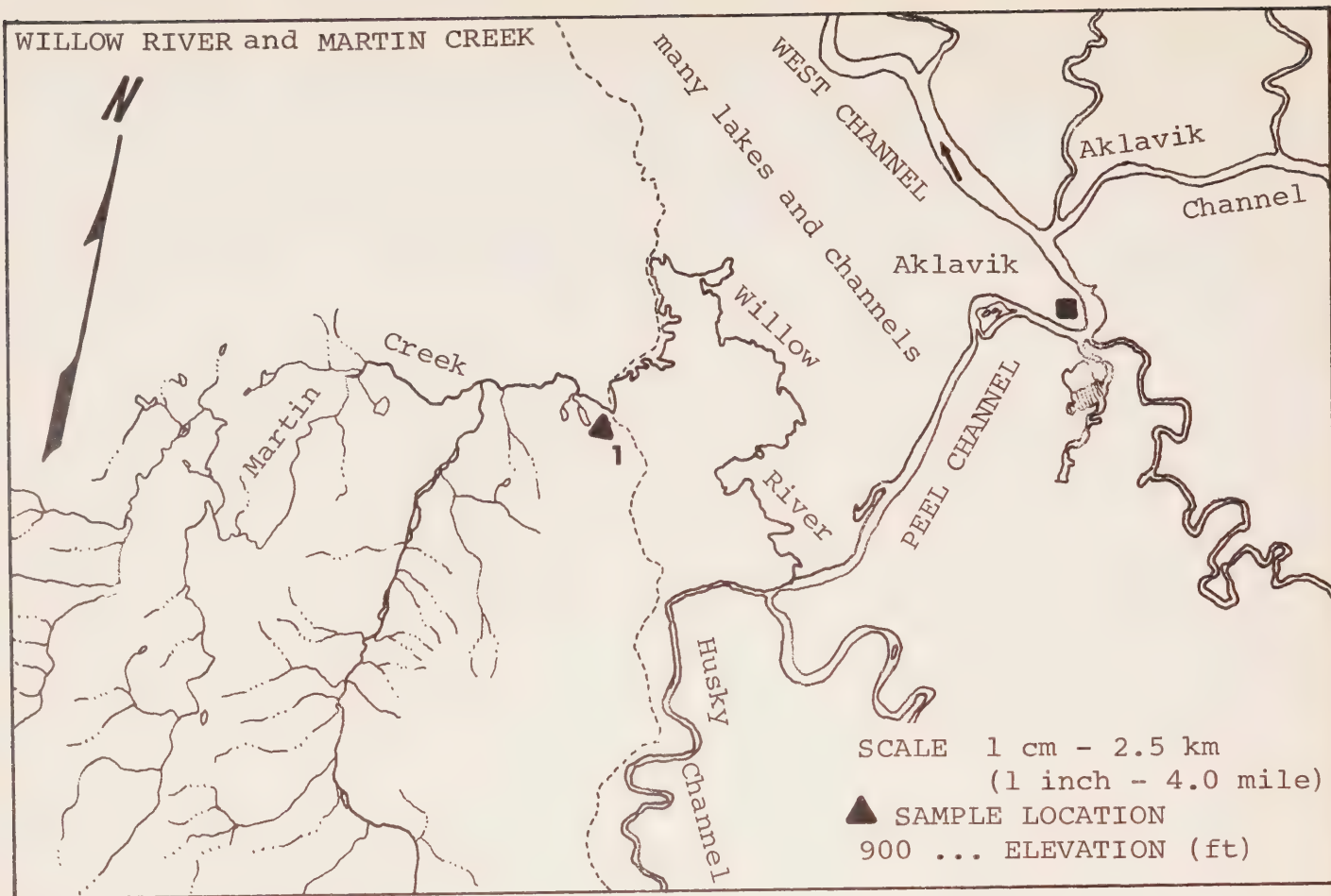
Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-72			18				
July 10	gravel	light silt	11	seine	grayling	1	immature
#2-72			18				
July 10	gravel	clear	11	angling	grayling	13	mature
#2-72			12				
Sept.05	gravel	clear	5	angling seine	negative grayling	6	immature

Sample Location Water Chemistry : Big Fish River

Location 2	Dates: 10-07-72	05-09-72
Temperature (C): Air-Water	18;11	12;5
Dissolved Oxygen (D.O.)	10ppm	12ppm
pH:	7.5	7.0
Alkalinity: Total (CaCO ₃)	34.2ppm	17.1ppm
Hardness : Total (CaCO ₃)	68.4ppm	68.4ppm

Sample Location Data: Cache Creek

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-72			20				
July 10	gravel	clear	11	angling seine	grayling Arctic char	5 30	mature immature



WILLOW RIVER

Total Length 54 miles; drainage area not available.

Watercourse Type

The Willow River meanders greatly in its lower reaches where it enters the Mackenzie Delta. Further upstream into the foothills of the Richardson Mountains, the river becomes a shallow, clear flowing stream with a gravel bottom. It flows through a deep valley from its headwaters to the middle reaches.

Riverbank Conditions

Not assessed. (see Sec. 5)

Assessment of the Fish Resources

The Willow River serves as a nursery area for the Arctic grayling, however, data on other fish species is minimal. The river is not fished domestically and information regarding any possible fish movement into this system has not been obtained.

Sample Location Data: Willow River

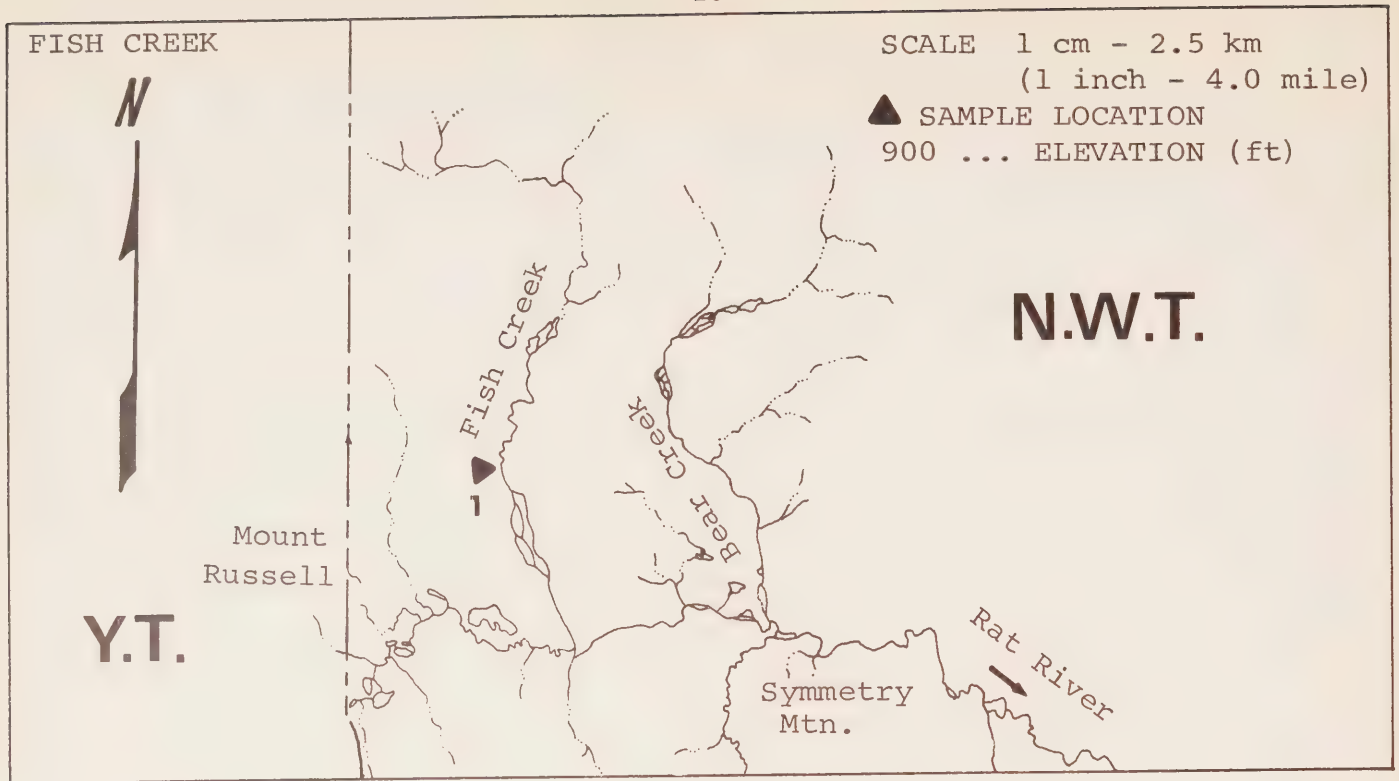
Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-72 July 08	gravel	clear	19 13	seine shocker	negative burbot whitefish sp.	1 1	immature immature
#1-72 Aug. 29	gravel	clear	13 8	seine	grayling	7	immature

Sample Location Water Chemistry

Location 1

Date: 29-08-72

Temperature (C): Air-Water 13;8
 Dissolved Oxygen (D.O.): 12ppm
 pH: 7.5
 Alkalinity: Total (CaCO₃) 34.2ppm
 Hardness : Total (CaCO₃) 102.6ppm



FISH CREEK

Total length 30 miles; drainage area 44 sq miles.

Watercourse Type

Fish Creek is a clear stream flowing over many large areas of gravel. Several deep pools are present but most stretches are shallow with a fast water flow.

Riverbank Conditions

Not assessed. (see Sec. 5)

Assessment of the Fish Resources

Fish Creek is a nursery area for the Arctic grayling and Arctic char. The char are known to spawn in this creek but Arctic grayling spawning activities have not been detected. During August and September, adults of both species migrate into this creek and overwintering may occur in some of the deeper pools. Domestic fishing has occurred in late September of some years but the sport fishery is limited to date.

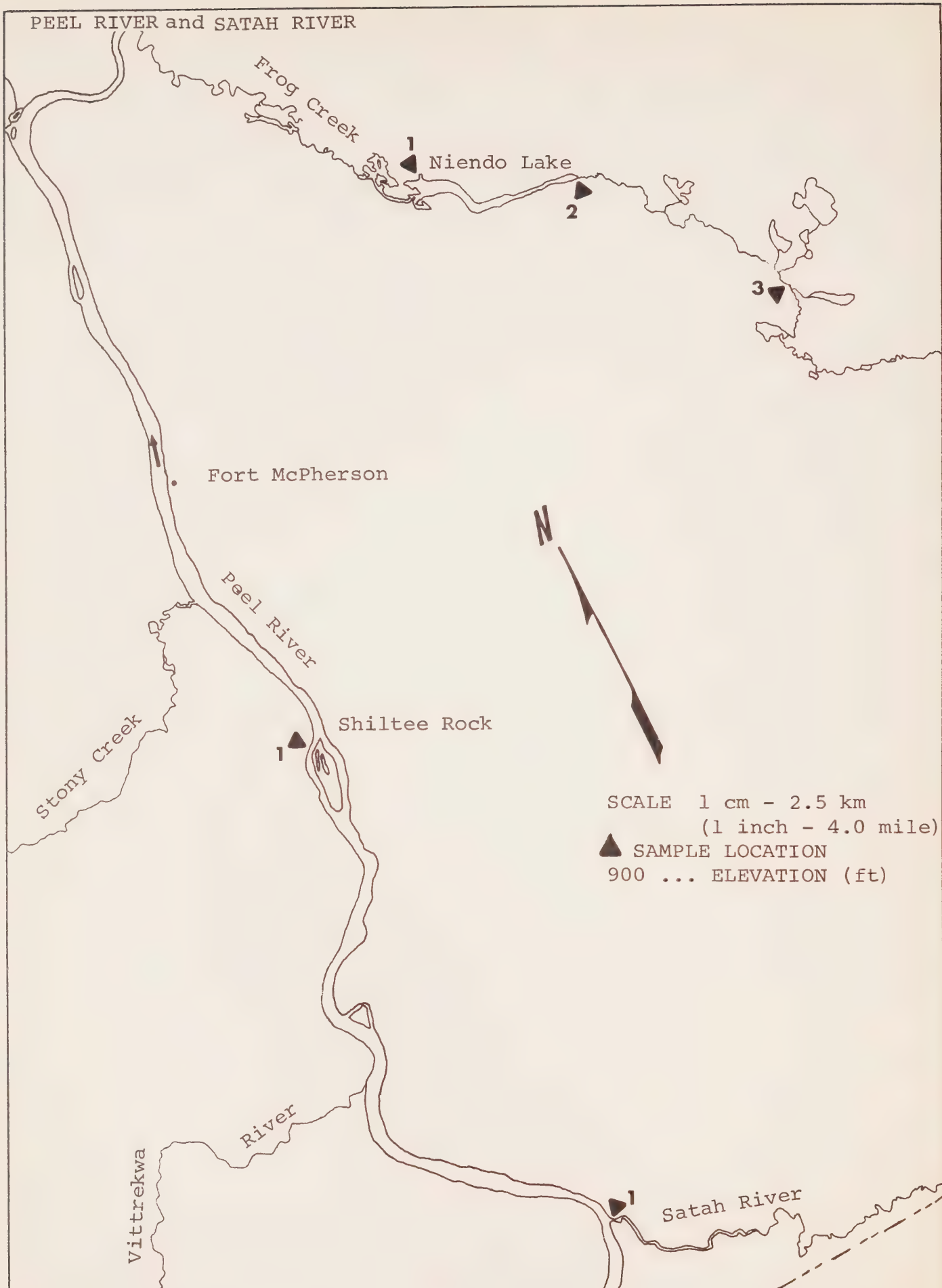
An intensive stream survey was conducted on the Rat River and Fish Creek during the field season of 1972. (Jessop et al., 1973)

Sample Location Data: Fish Creek

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 Aug.18	gravel	clear	20 8	angling	grayling Arctic char	6 2	mature mature
#1-71 Sept.23	gravel	clear	8 4	seine	grayling Arctic char	21 2	immature mature
				angling	grayling Arctic char	2 13	mature mature
#1-72 Sept.04	gravel	clear	12 5	angling	grayling Arctic char	2 3	mature mature
				seine	slimy sculpin Arctic char	1 38	mature immature
#1-72 Sept.17	gravel	clear	5 3	angling seine	Arctic char slimy sculpin Arctic char	28 4 12	mature mature immature

Sample Location Water Chemistry

Location 1	Dates:	04-09-72	17-09-72
Temperature (C): Air-Water:		12;5	5;3
Dissolved Oxygen (D.O.):		11ppm	10ppm
pH:		8.0	8.5
Alkalinity: Total (CaCO ₃)		119.7ppm	119.7ppm
Hardness : Total (CaCO ₃)		119.7ppm	153.9ppm



PEEL RIVER

Total length 274 miles; drainage area 42,529 sq miles.

Watercourse Type

In the length surveyed to the Yukon boundary, the Peel River consists of a wide channel with primarily mud banks. Extensive mud bars are present during low water conditions. Water levels fluctuate greatly after rains in the mountains, which form a large portion of the Peel River drainage area.

Riverbank Conditions

Not assessed. (see Sec. 5)

Assessment of the Fish Resources

The Peel River exists as a migration route to spawning areas for a number of fish species. Various tributaries of the Peel River are suspected spawning and nursery areas, as are many regions of the Peel itself in the Yukon. It has been reported that whitefish spp., Arctic cisco, inconnu and least cisco run up the Peel in July and August to spawn in the vicinities of the Road and Snake Rivers of the Yukon Territory. In this area the Peel River and most tributaries have extensive gravel areas. Downstream migrations of Arctic cisco and inconnu occur at freezeup in early October. The Peel River supports a substantial domestic fishery in the summer and fall with camps located along the lower 70 miles of the river. Arctic cisco, humpback whitefish, broad whitefish and inconnu are the major species taken.

STONY CREEK - Assessment of Fish Resources

This creek serves as a spawning and nursery area for Arctic grayling, round whitefish and possibly least cisco. Mature grayling and round whitefish were taken at the mouth of Stony Creek in September, probably moving into the Peel River to overwinter. Grayling and round whitefish fry were taken further upstream where the current is swifter and the bottom is predominantly gravel. Mature least cisco including one ripe female were also caught in mid-September slightly upstream from the mouth.

Sample Location Data: Peel River

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-71 July 12	bedrock	heavy silt	19 14	seine	lake chub slimy sculpin	7 mature 1 immature
#1-71 Aug.17	Location Not Sampled - Flooded					
#1-71 Sept.24	bedrock	heavy silt	11 6	seine	lake chub longnose sucker least cisco burbot	5 mature 3 immature 1 immature 1 immature
#1-72 July 05	bedrock	heavy silt	22 16	seine	lake chub humpback whitefish	9 mature 2 immature

Sample Location Water Chemistry

Location 1

Date: 05-07-72

Temperature (C): Air-Water: 22;16

Dissolved Oxygen (D.O.): 10ppm

pH: 8.0

Alkalinity: Total (CaCO₃) 119.7ppmHardness : Total (CaCO₃) 136.8ppm

FROG CREEK - NIENDO LAKE

Total length 52 miles; drainage area unavailable.

Watercourse Type

From the Peel River to Niendo Lake, Frog Creek is a highly meandering stream flowing through a low-lying terrain. The creek passes through a number of small lakes and ponds in the vicinity of Niendo Lake. Above Niendo Lake the creek flows along a deep gully. Gravel deposits are more in evidence above Niendo Lake than below it.

Riverbank Conditions

Not assessed. (see Sec. 5)

Assessment of Fish Resources

Frog Creek below Niendo Lake serves as a nursery area for whitefish spp., Arctic cisco and longnose suckers. It is not known where actual spawning of these species occurs. Niendo Lake maintains a good population of whitefish spp. and pike but any possible movements of these fish are unknown. In Frog Creek above Niendo Lake there is a spawning run of northern pike into the creek during the spring months. The creek is periodically fished domestically at its mouth on the Peel River during the summer and fall.

Sample Location Data: Frog Creek

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#3-72 July 03	gravel	clear		angling observed	pike pike	4 ripe 50+ unknown
#3-72 Sept. 14	gravel	clear		angling	negative	

Sample Location Data: Niendo Lake

#1-71 Aug. 14	gravel	clear		gill net	pike broad whitefish	2 mature 6 mature
#1-71 Sept. 23	gravel	clear		gill net	least cisco broad whitefish	2 mature 2 mature
#1-72 Sept. 14	gravel	clear		gill net	pike broad whitefish	2 mature 5 mature
#2-72 July 05	unknown	clear		gill net	inconnu	2 mature
#2-72 Sept. 14	unknown	clear		gill net	negative	

SATAH RIVER

Total length 56 miles; drainage area not available.

Watercourse Type

Upstream from its mouth on the Peel River, the Satah River has a heavy silt coloration and gently meanders for 6 - 8 miles. The river banks through this stretch are mud and bottom type was undefined. Further upstream the meander is less marked and the channel becomes wider and shallower with some gravel areas.

Riverbank Conditions

Not assessed. (see Sec. 5)

Assessment of the Fish Resources

The Satah River appears to be a nursery area for the Arctic cisco and other members of the whitefish family. Gill net catches at the mouth were substantial but the species concerned may be entering the Satah River or moving in the Peel River. The river has been domestically fished at its mouth.

Sample Location Data: Satah River

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-71 July 12	gravel mud	heavy silt	13 15	gill net	broad whitefish	8 mature
					humpback	
					whitefish	2 mature
					least cisco	1 mature
					longnose sucker	1 mature
					pike	4 mature
					inconnu	1 mature
#1-72 July 05	gravel mud	heavy silt	17 13	gill net	Arctic cisco	9 mature
					inconnu	2 mature
					pike	1 mature

RENGLENG RIVER

MACKENZIE RIVER

treefall
obstructionKame formations
(see text)SCALE: 1 cm - 2.5 km
(1 inch - 4.0 mile)

▲ SAMPLE LOCATION

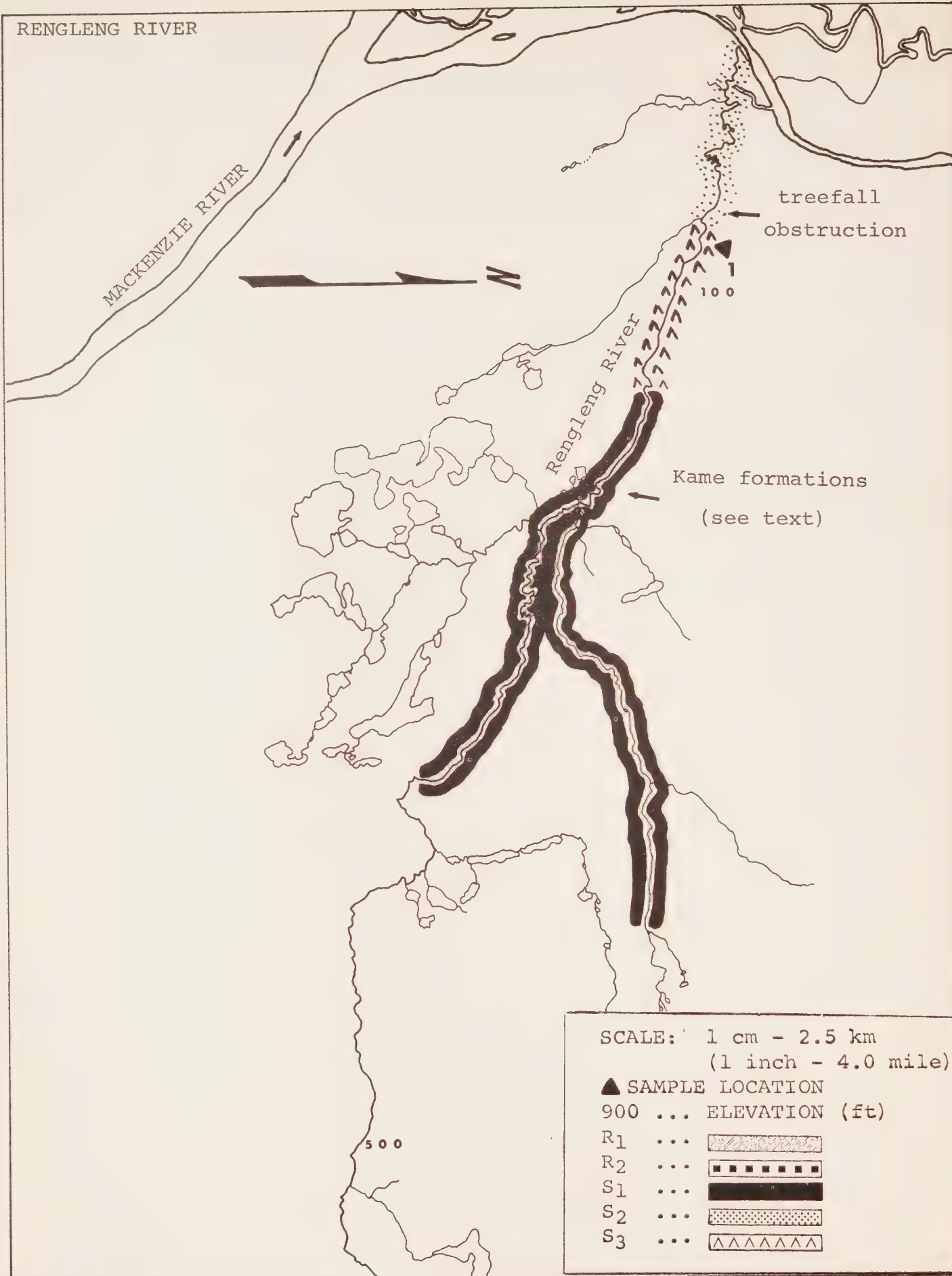
900 ... ELEVATION (ft)

R₁ ... R₂ ... S₁ ... S₂ ... S₃ ... 

500

100

1



RENGLENG RIVER

Total length 72 miles; drainage area 672 sq miles.

Watercourse Type

This is a single channel, non-mountain river. The many small lakes within the upper reaches of the river may exert some control over flood flows.

The river bottom throughout much of its length is composed of thin fractured shale. Gravel is also abundant.

Riverbank Conditions

The lower 6 miles of river have a very extensive meandering action. The actual river channel is extremely difficult to follow because of the many cut-offs and old channels.

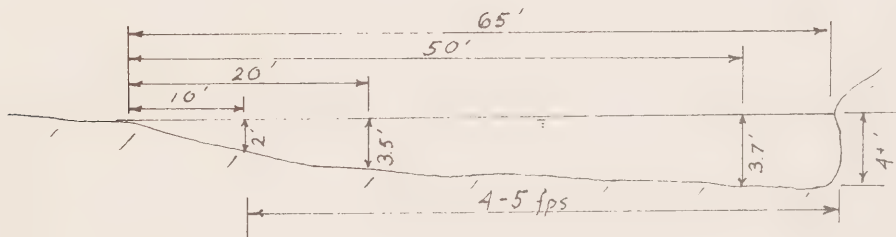
The river from mile 6 to mile 14 flows through a deep valley with 100 foot vertical valley walls. Exposed clay and shale sections are very common. The valley bottom in this region is approximately 500 - 1,000 feet wide.

From the 14 mile mark to the headwaters the valley sides decrease steadily in both height and slope until the river is eventually flowing through a flat, low-lying muskeg type terrain.

Evidence in the form of kames (glacial hills) appears at approximately the 20 mile mark. These hills are often an indication of gravel deposits.

Flow Conditions

Date: 03-07-72
Location: Station 1



Note: High water mark was observed to be approximately 2 feet above measured depth.

Assessment of the Fish Resources

Major species encountered in the Rengleng River are Arctic grayling and northern pike, both of which utilize the river as a spawning and nursery area. It is also suspected that the river is a nursery area for such species as longnose sucker, yellow walleye and whitefish spp. based on catch data from the Arctic Red River base. Burbot and inconnu fry were also caught at the river mouth but not in sufficient numbers to determine if they were associated with the Rengleng River system.

The river mouth is fished periodically by domestic fisheries.

Sample Location Data: Rengleng River

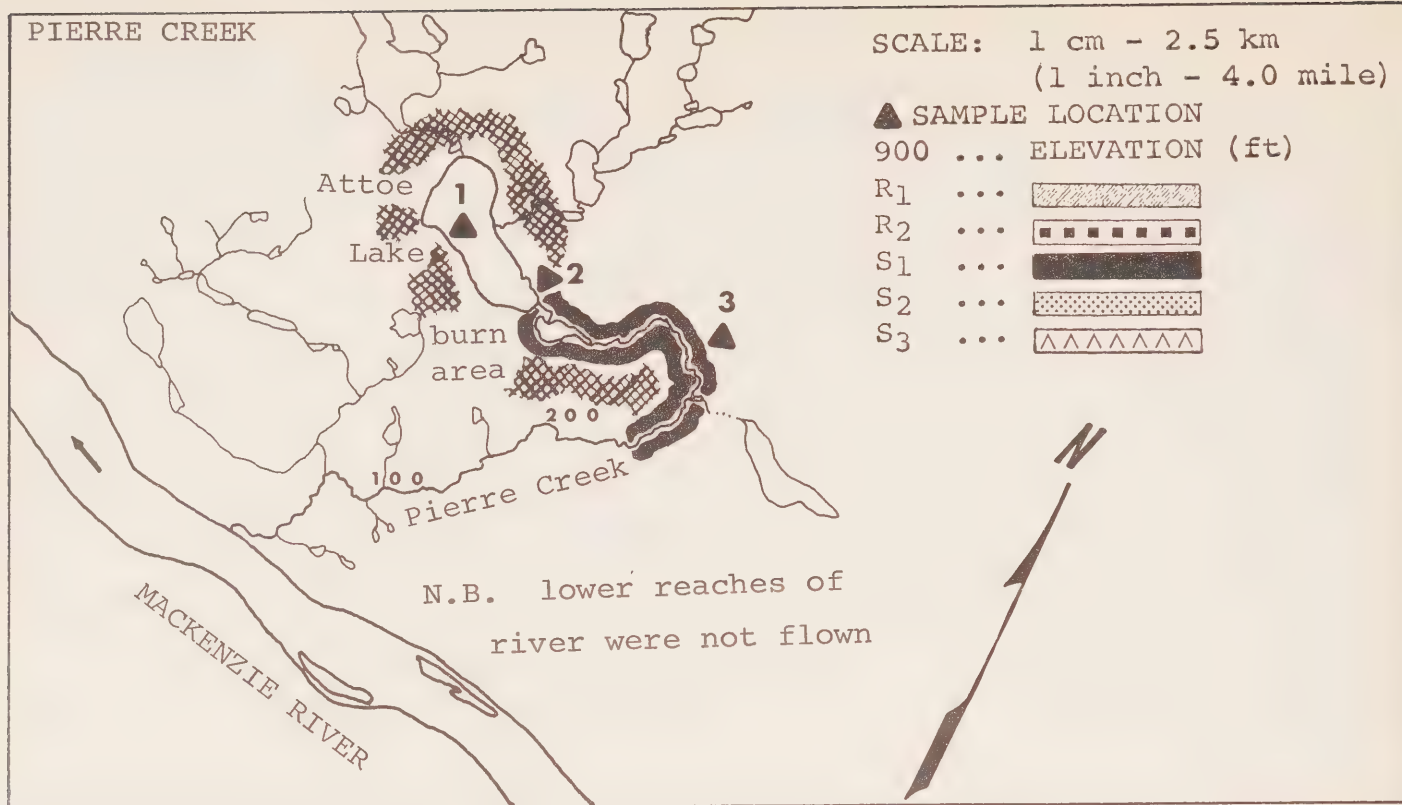
Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 July 09	sand silt	light rust	26 20	seine observed	negative grayling	7	immature
#1-71 Aug. 11	gravel	clear	15 12	observed	grayling	1	immature
#1-71 Sept. 24	shale gravel	light rust	7 3	negative			
#1-72 July 03	shale silt	dark rust	18 14	seine	negative		
#1-72 Sept. 12	shale silt	clear	8 5	seine angling	negative grayling	2	mature
#2-71 July 09	gravel	clear	28 20	observed	slimy sculpin	3	mature
#2-71 Aug. 02	gravel sand	clear	10 10	seine	negative		
#2-71 Sept. 24	gravel	clear	6 5	angling	negative		

Sample Location Data: Rengleng River Cont'd

Location 2 not sampled in 1972, previously located at the outlet of In and Out Lake.

Sample Location Water Chemistry

Location 1	Dates: 13-07-72	12-09-72
Temperature (C): Air-Water:	18;14	8;5
Dissolved Oxygen (D.O.):	9ppm	13ppm
pH:	7.5	7.5
Alkalinity: Total (CaCO ₃)	34.2ppm	51.3ppm
Hardness : Total (CaCO ₃)	51.3ppm	68.4ppm



PIERRE CREEK

Total length 18 miles; drainage area 262 sq miles.

Note: Because of station locations only the upper reaches of Pierre Creek were observed during the 1972 spring synoptic survey. The description of this river, therefore is mainly a repeat of the 1971 synoptic comments.

Watercourse Type

Pierre Creek is a narrow (15 foot width on 30/6/72) meandering stream. Natural obstructions such as log jams and beaver dams were observed along the river course.

Riverbank Conditions

The river banks near Attoe Lake are low and stable. There is however, a noticeable siltation of the stream, probably a result of the vegetation in the area being burnt recently.

That the river overflows its banks near Attoe Lake during flood is shown by the high water mark being somewhat into the trees.

Assessment of the Fish Resources

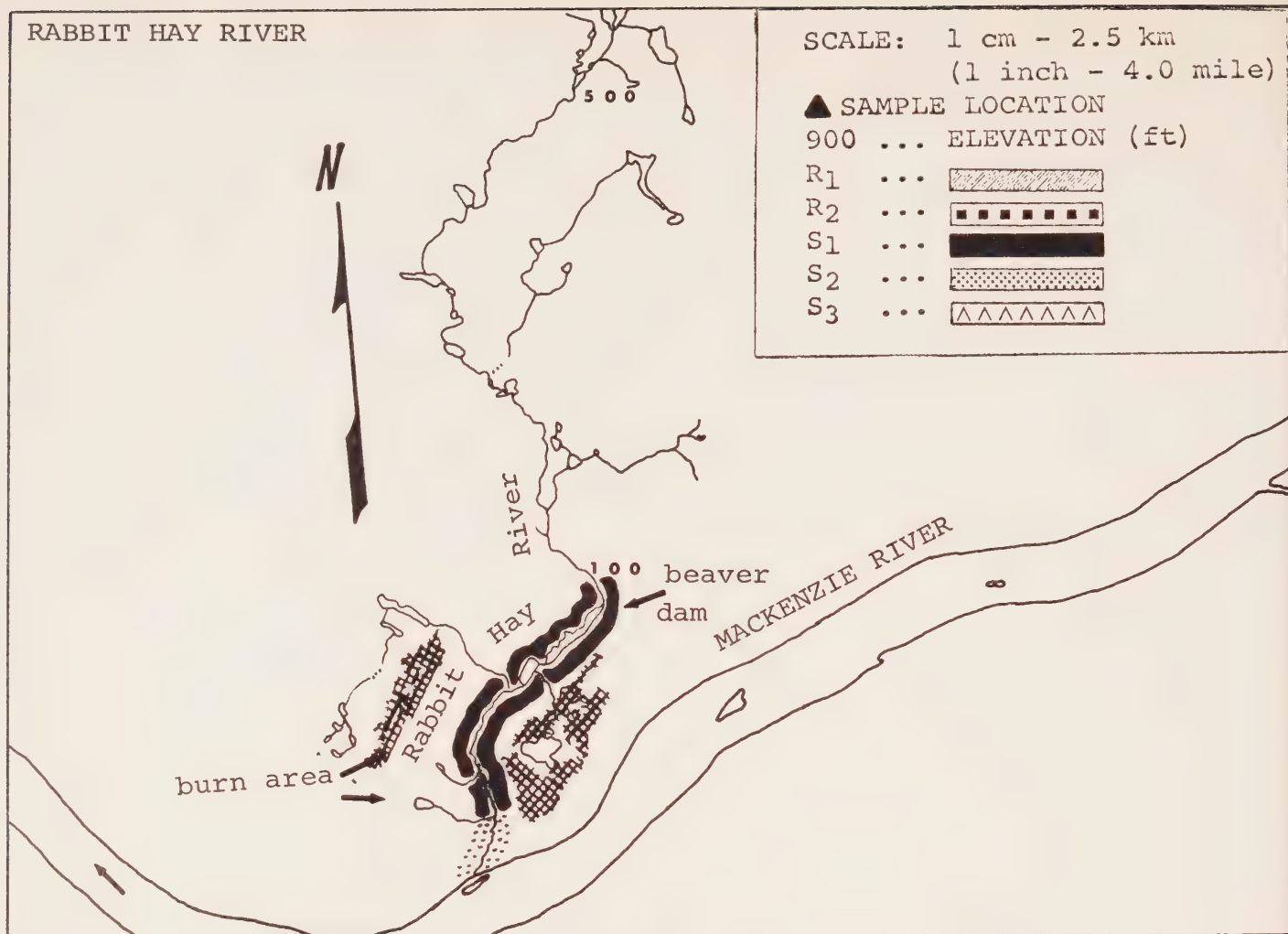
Based on Arctic Red River base data at the mouth and synoptic data from the headwaters near Attoe Lake, Pierre Creek is utilized by Arctic grayling as a spawning stream and possible migratory route. Stretches of the creek near the lake are also probably used by northern pike as spawning areas. It has not been determined whether whitefish species caught in Attoe Lake spawn in the lake or creek regions. The lower reaches of the creek are utilized by the longnose sucker for spawning and nursery areas in the spring and early summer. Good catches of broad whitefish slightly upstream from the mouth indicate this species also spawns in Pierre Creek. Inconnu, yellow walleye and cisco spp. were caught near the mouth but in lesser numbers than the above.

Sample Location Data: Pierre Creek

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#3-71 July 07	gravel	clear	22 18	seine	grayling	20	immature
#3-71 Aug. 11	Sampling impracticable due to low water level.						
#3-72 July 04	gravel	clear	--	angling	negative		

Sample Location Data: Attoe Lake

#1-71 Aug. 18	sand silt	clear	14 12	gill net	pike	1	mature
					broad whitefish	1	mature
#2-72 July 04	sand silt	clear	--	gill net	grayling	1	spent
					pike	3	spent
					humpback whitefish	1	mature
#2-72 Sept. 14	sand silt	clear	--	gill net	pike	2	mature
					humpback whitefish	2	mature



RABBIT HAY RIVER

Total length 28 miles; drainage area 148 sq miles.

Watercourse Type

This is a single channel, sand bed river. A type of flood control feature, caused by beaver dams ponding water behind them, occurs within the middle reaches of the river.

Riverbank Conditions

The lower two miles of this river are meandering. The river banks in this reach are typically 30 feet high and composed of silts and clay.

The river from mile 2 to mile 9 flows through a valley having a $\frac{1}{2}$ mile wide valley bottom and gently sloping valley walls (10^0+). The banks in this region are low and densely overgrown with trees. Beyond the immediate river banks however, the surrounding terrain has been burned over. Beaver dams, which impound water 3 to 4 feet above normal river level, and many tree falls may be posing an obstacle to fish movement.

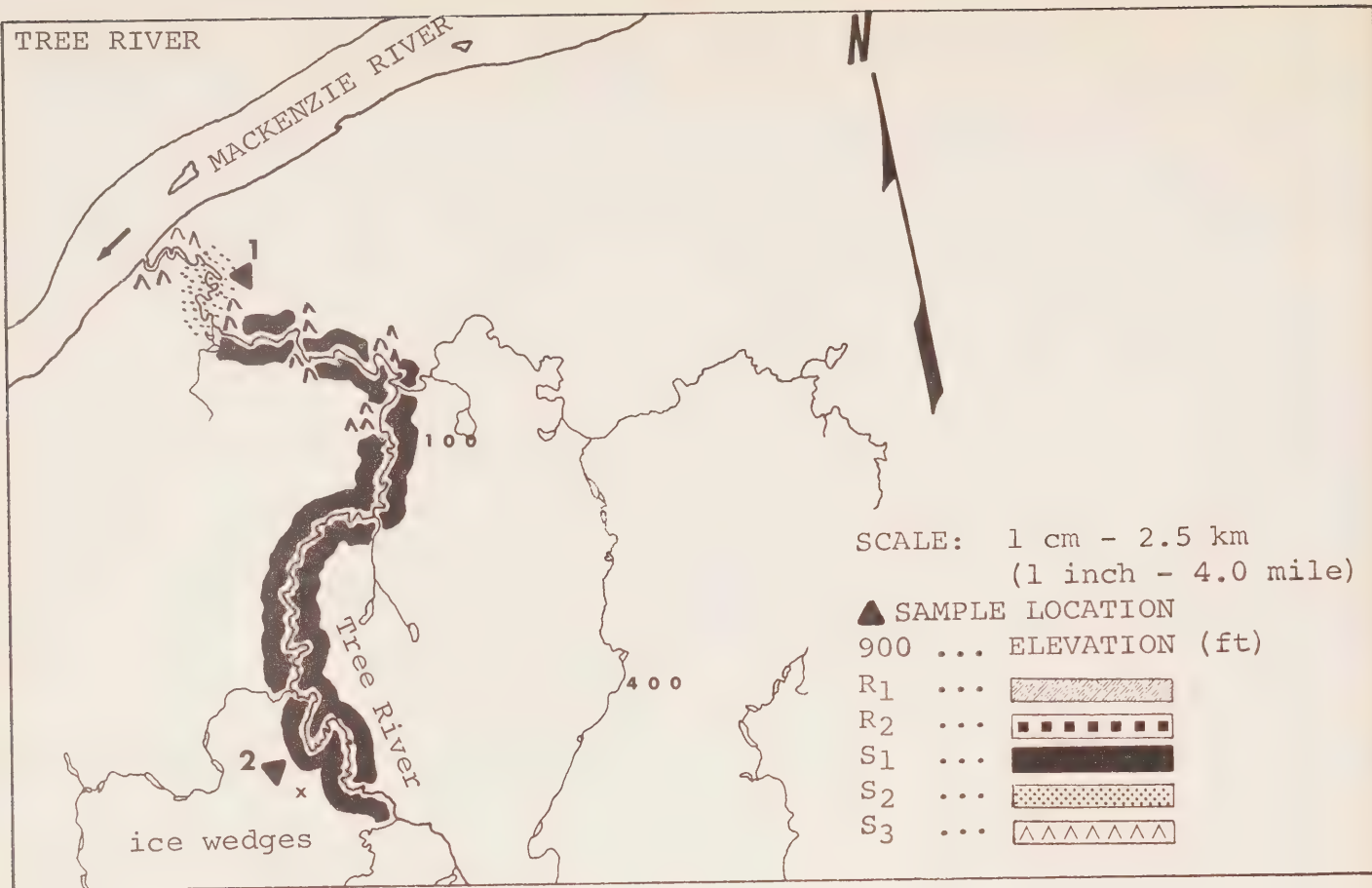
At approximately the 9 mile mark the river enters a high and narrow valley.

Flow Conditions

Date:	30-06-72
Location:	Station 2
Estimated width	20 feet
Estimated velocity	1-2 fps

Assessment of the Fish Resources

The major species encountered on the Rabbit Hay River were northern pike and longnose sucker. Both species appear to utilize the lower reaches of the river for spawning purposes in the spring and early summer. The river is also used by whitefish spp. in the fall for spawning purposes, however in a limited nature. The river is not fished domestically.



TREE RIVER

Total length 52 miles; drainage area 1,393 sq miles.

Watercourse Type

This is mainly a single channel river with several stretches of divided flow. Most of the river surveyed had a good mixture of fine and coarse gravel. Within the upper reaches of the river both ice-wedge and esker formations occur.

Riverbank Conditions

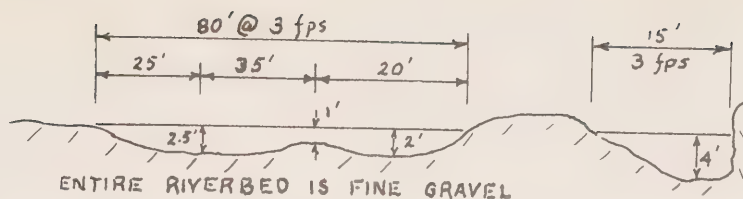
The lower 8 miles of the Tree River are deeply incised between high valley walls. The actual riverbank is generally 5 to 8 feet above the water surface, but the valley walls are 50 to 70 feet high with slopes of approximately 70° . There are many regions of exposed clay and shale.

From approximately the 8 mile mark through to the headwaters the valley flattens out. The river in this region is clear and dotted with gravel shoals.

Flow Conditions

Date: 30-06-72

Location: Station 1



Assessment of the Fish Resources

Just upstream of the mouth of the Tree river is a suspected grayling and burbot spawning area. Grayling are present throughout most of the river. During late September there was a movement of grayling out of Tree River. The river is fished at its mouth by natives throughout the summer season.

Sample Location Data: Tree River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 July 08	gravel	clear	23 16	seine	lake chub	28	mature
#1-71 Aug. 12	gravel	light rust	11 12	seine	longnose sucker	118	immature
					lake chub	2	mature
					trout perch	2	mature
#1-71 Sept. 20	gravel	light rust	13 7	seine	longnose sucker	7	immature
					lake chub	69	mature
#1-72 June 30	gravel	light rust	18 12	seine	lake chub	33	mature
					longnose sucker	5	immature
					slimy sculpin	1	immature
#2-71 July 08	gravel	clear	25 17	seine	grayling	10	immature
#2-71 Aug. 12	gravel	clear	13 11	seine	grayling	3	immature

Sample Location Data: Tree River Cont'dSample Location Data: Tree River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#2-71 Sept. 20	gravel	light rust	15 7	seine	grayling	1	immature
#2-72 June 30	gravel	light rust	20 12	seine	grayling	37	immature
					burbot	5	immature
					lake chub	1	immature
				angling	grayling	1	mature

Sample Location Water Chemistry

Location 2

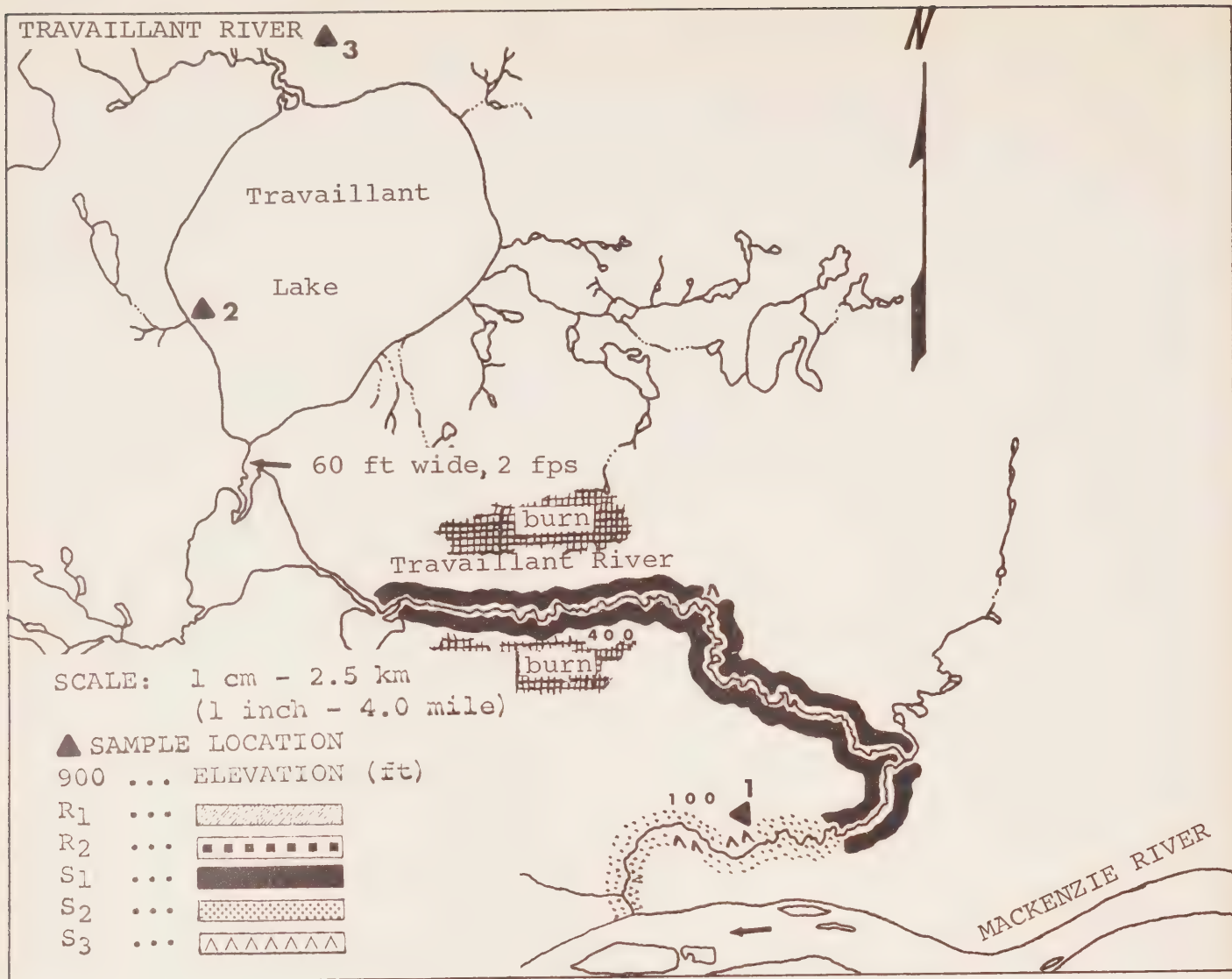
Date: 30-06-72

Temperature (C): Air-Water: 20;12

Dissolved Oxygen (D.O.): 9ppm

pH; 8.0

Alkalinity: Total (CaCO₃) 68.4ppmHardness : Total (CaCO₃) 68.4ppm



TRAVAILLANT RIVER

Total length 78 miles; drainage area 139 sq miles.

Watercourse Type

This is a single channel, non-mountain river. Travaillant Lake is large enough to be a possible control-feature for flood flows. Fine and coarse gravels prevail as the river bottom material.

Riverbank Conditions

The lower 7 miles of Travaillant River are incised between high (50+feet), steep valley walls. There are several areas of sand and mud slides within this stretch of river. The potential for siltation of the river is high.

From the 7 mile mark through to Travaillant Lake the river is classified as S₁ (stable). The difficulty here is that the river was in flood at the time of visit and the actual bank conditions could not be examined. The S₁ classification therefore is based on the lack of observed erosion and the flatness of the surrounding terrain. Problems could be encountered in the upper and middle reaches of this river, as a result of heavy river meander. The upper reaches of the river also pass through a recent burn area.

Riverbank Conditions Cont'd

The surrounding terrain just downstream of Travaillant Lake slopes gently (10° to 15°) down to the river edge.

Flow Conditions

Date: 04-07-72

Location: Approximately 9 miles from mouth.

The flood conditions at the time of visit prevented the helicopter from landing anywhere along the river. Estimates were therefore, made from the air.

Estimated width 40 feet

Estimated velocity 4-6 fps

The current velocity in the upper reaches of the river are appreciably slower.

Assessment of the Fish Resources

Travaillant River has a good potential for spawning areas due to the presence of gravel throughout most its length. The river is generally swiftly flowing throughout the season and this condition hampered seining operations. The major species caught was longnose sucker which utilize the river for spawning and nursery purposes. Little information is available on the other fish species which may occur in the river. Travaillant Lake possesses a wide diversity of fish species and is fished domestically year-round. Longnose sucker and northern pike utilize the gravel areas and shallows in the shores of the lake for spawning purposes. Arctic grayling also use some of the small creeks feeding the lake for spawning and nursery areas; this species is more common in the river above Travaillant Lake.

Sample Location Data: Travaillant River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 July 14	gravel	clear	20 17	seine	grayling longnose sucker humpback whitefish	1 9 4	immature immature immature
#1-71 August 11	gravel	green	8 11	negative			
#1-71 Sept. 20	gravel	green	15 7	observed	longnose sucker	8	immature
#3-71 July 14	gravel	clear	15 15	seine	grayling	4	immature
#3-71 Aug. 11	gravel	clear	7 8	seine	negative		
#3-71 Sept. 20	gravel	clear		negative			

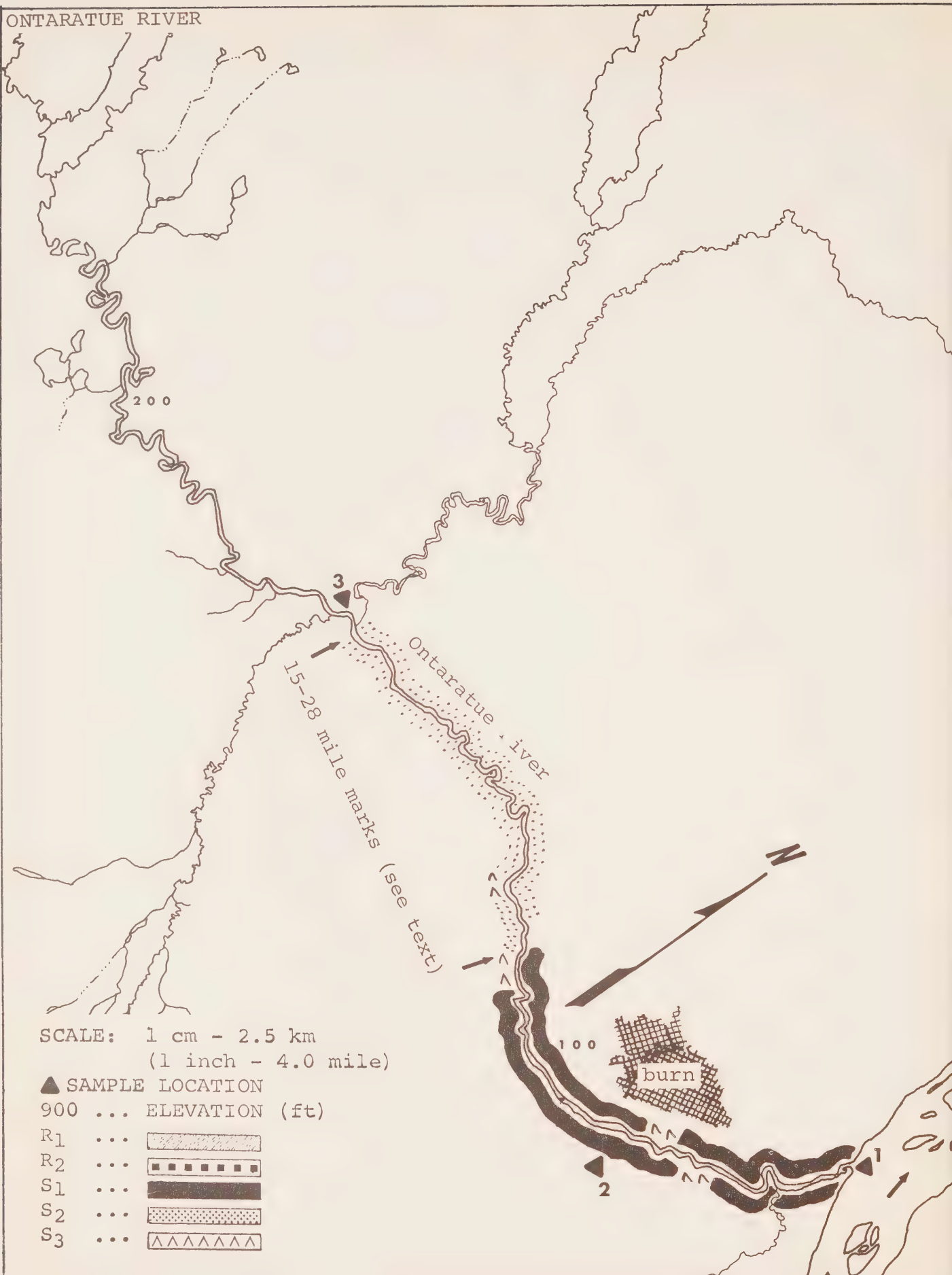
River stations in flood stage at time of 1972 survey.

Sample Location Data: Travaillant Lake

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#2-71 Aug. 12	gravel	clear	9 12	gill net seine	pike*	1	mature
					grayling	8	immature
					longnose sucker	26	immature
					ninespine		
					stickleback	1	immature
					broad whitefish	1	immature
#2-71 Sept. 20	gravel	clear	13 4	gillnet seine	humpback whitefish	3	immature
					pike	1	mature
					lake trout	1	mature
					grayling	5	immature
					longnose sucker	5	immature
					least cisco	1	immature
					pond smelt	33	mature
#2-72 July 04	gravel	clear	25 16	angling observed seine	pike pike longnose sucker	10 100+ 45	spent -- immature

* Stomach analysis revealed a 3" yellow walleye.

ONTARATUE RIVER



ONTARATUE RIVER

Total length 103 miles; drainage area 3,724 sq miles.

Watercourse Type

This is a single channel non-mountain river. There are no flood control features. The lower reaches of this river pass between two high-ground regions. This may account for the marked increase in river flow after periods of rain. The over-land run-off within this region also causes a noticeable silt load to enter the river during spring run-off. Gravel and shale comprise much of the river bed material.

Riverbank Conditions

The lower 14 to 15 miles of this river have little meander and low banks (3 to 4 feet above water level). The valley bottom is approximately 100 feet wide with low slope (10°) valley sides. The river banks in this region are generally well vegetated. Several seismic lines near the river mouth show little evidence of erosion. The exception within this region, to stable conditions occurs at approximately the 5 mile mark. Here mud flows and tree falls may indicate unstable sub-surface conditions.

The reach of river from the 15 to 18 mile marks is classified in a general and undefined manner. Within this region the river banks are generally very prone to erosion on both a large and small scale. There occur many regions of steep clay banks (50 to 70 feet high) displaying mud flows and slope failure. One such slide, undefined as to exact location, presently extends almost half way across the river. Construction within this region could cause excessive siltation of the river.

Flow Conditions

Date:	21-06-72
Location:	Station 3
Estimated width:	75 feet
Estimated velocity	average 3.0 fps

Assessment of the Fish Resources

The Ontaratue River data is very limited at this time and the only species found in sufficient numbers to indicate a trend was northern pike. The species utilize the river for spawning purposes and it also serves as a nursery area for immature pike. The river is not fished domestically.

Sample Location Data: Ontaratu River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-72 June 20	mud silt	heavy silt	--	gill net	inconnu	2	mature
					walleye	1	immature
					pike	1	spent
#2-71 July 07	gravel	clear	27 18	seine observed	slimy sculpin pike	1	immature
						6	immature
#2-71 Aug. 06	gravel	clear	19 16	seine observed	negative pike		
						2	immature
#2-71 Sept. 16	Station flooded						
#2-72 June 21	Station flooded						
#3-71 July 07	boulders	clear	29 16	seine	trout perch	1	immature
					slimy sculpin	1	immature
#3-71 Aug. 08	gravel	light rust	18 18	seine observed	lake chub	10	mature
					pike	1	immature
					pike	3	immature
#3-71 Sept. 16	Station flooded						
#3-72 June 21	gravel	light rust	18 14	seine	lake chub	4	mature
					longnose sucker	1	immature

Sample Location Water Chemistry

Location 3

Date: 21-06-72

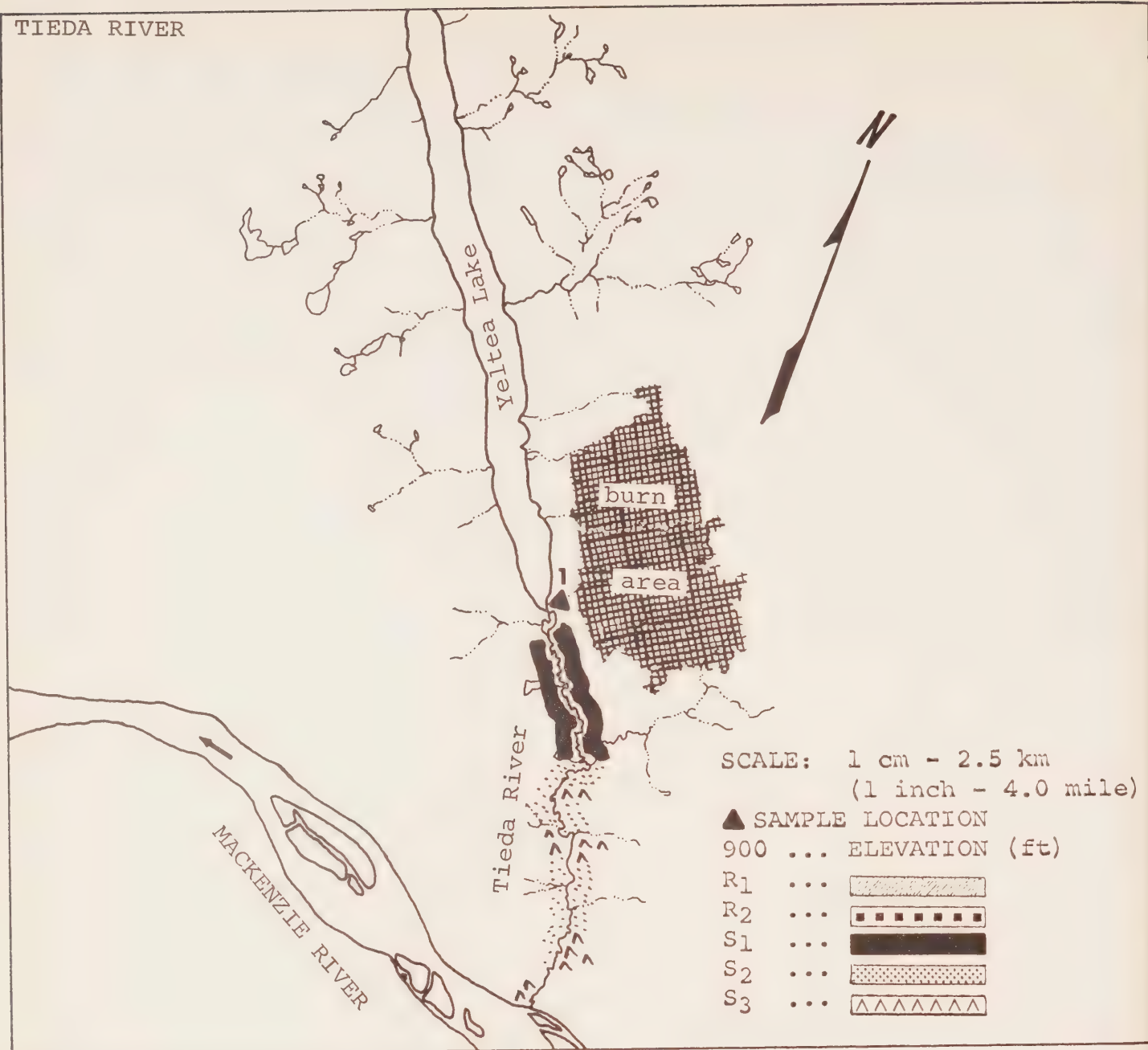
Temperature (C): Air-Water: 18;14

Dissolved Oxygen (D.O.): 9ppm

pH: 8.0

Alkalinity: Total (CaCO_3) 51.3ppmHardness : Total (CaCO_3) 68.4ppm

TIEDA RIVER

TIEDA RIVER

Total length 14 miles; drainage area 384 sq miles.

Watercourse Type

This is a single channel, sand bed river having lake control. The river flows through a valley which becomes progressively deeper as it approaches the Mackenzie River. The upstream portions of the Tieda River contain fine gravel and sand.

Riverbank Conditions

The lower 6 miles of river flow through a deep, wide valley. The valley sides are 80 feet high on a 30° slope with several stretches of exposed clay and shale. The river current in this area is fast with many small rapids.

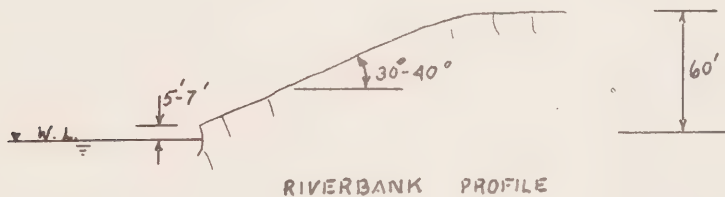
TIEDA RIVER Cont'dRiverbank Conditions cont'd

The middle reaches of the river exhibit heavy meander with many mud slides into the river. The typical riverbank height above water level is approximately 5 feet.

At approximately the 8 mile mark, the valley slope decreases to approximately 15° to 20° . The meander increases progressively from this point to the lake. Although the riverbanks are low, the results of a recent forest fire are shown by overland erosion and tree falls. This area could be classified as either S_1 or S_2 .

Flow Conditions

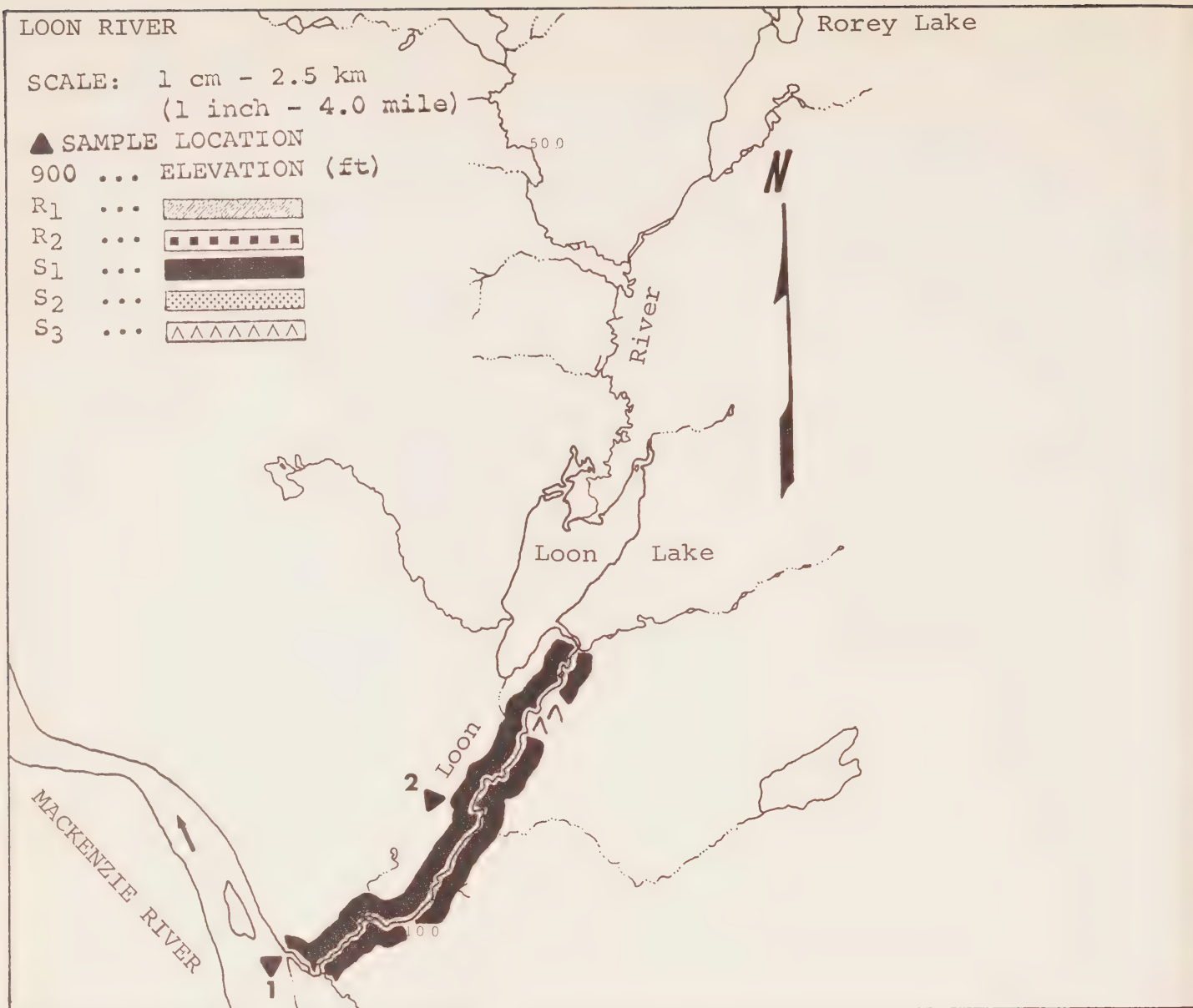
Date:	20-06-72
Location:	6 miles from mouth
Estimated width	40 feet
Estimated depth	3 feet
Estimated current	3 - 4 fps

Assessment of the Fish Resources

Possible spawning and nursery areas occur in the upper reaches of the Tieda River and along the shoreline of Yelte Lake. Fish runs are undefined.

Sample Location Data: Tieda River - Yeltea Lake

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-71 July 08	sand	clear	22 16	angling observed	pike grayling	1 mature 20+ mature
#1-71 Aug. 08	sand	clear	9 15	observed	pike	1 mature
#1-71 Sept. 09	sand gravel	clear	10 9	seine gill net	ninespine stickleback humpback whitefish lake trout	1 mature 2 mature 3 ripe
#1-72 June 20	sand gravel	clear	13 11	gill net	humpback whitefish	2 mature



LOON RIVER

Total length 81 miles; drainage area 1,389 sq miles.

Watercourse Type

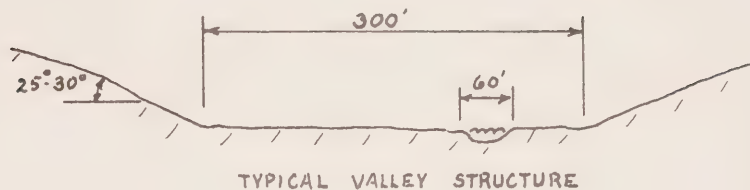
This is a single channel, sand bed river. The river flows through a valley with a controlled meander and a flat wide flood plain which shows little evidence of recent flooding. There are many areas of clean gravel. The valley walls are gentle and well-treed.

Riverbank Conditions

Stable conditions exist along the entire length of the river with the exception of the marsh region at the river mouth and the S₃ area at the 10 mile mark. This latter area is 150 feet long and shows heavy failure of the active layer. River bank here is 80 feet high on a slope of 70° and has much exposed clay.

LOON RIVER Cont'dFlow Conditions

Date: 21-06-72
 Location: Station 1
 Estimated width 60 feet
 Estimated depth 5 feet
 Estimated velocity 3 to 4 fps

Assessment of the Fish Resources

The Loon River appears to be a nursery area for such fish species as longnose sucker, whitefish spp. and cisco spp. Timing of spawning runs have not as yet been defined. The river mouth and Loon Lake are periodically fished domestically during the summer and winter. Rorey Lake is also fished domestically during the winter.

Sample Location Data: Loon River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-72 June 19	mud silt	heavy silt	14 11	gill net	humpback		
					whitefish	2	immature
					pike	1	immature
					broad whitefish	1	immature
					cisco sp.	1	immature
#2-71 July 08	gravel	clear	21 14	angling seine	negative negative		
#2-71 Aug. 08	gravel	clear	10 15	observed	longnose sucker	20	immature

Sample Location Data: Loon River Cont'd

Sample Location Data: Loon River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#2-71			10				
Sept. 17	gravel	clear	8	seine	pike	1	immature
					longnose sucker	9	immature
#2-72			15				
June 21	gravel	light silt	13	seine	longnose sucker	9	immature
					ninespine		
					stickleback	1	mature
					broad whitefish	1	immature
					least cisco	1	immature
					Arctic cisco	1	immature

Sample Location Water Chemistry

Location 2

Date: 21-06-72

Temperature (C): Air-Water: 15;13

Dissolved (D.O): 9ppm

pH: 8.0

Alkalinity: Total (CaCO₃) 68.4ppmHardness : Total (CaCO₃) 85.5ppm

HARE INDIAN RIVER




SCALE: 1 cm - 2.5 km
(1 inch - 4.0 mile)

▲ SAMPLE LOCATION

900 ... ELEVATION (ft)

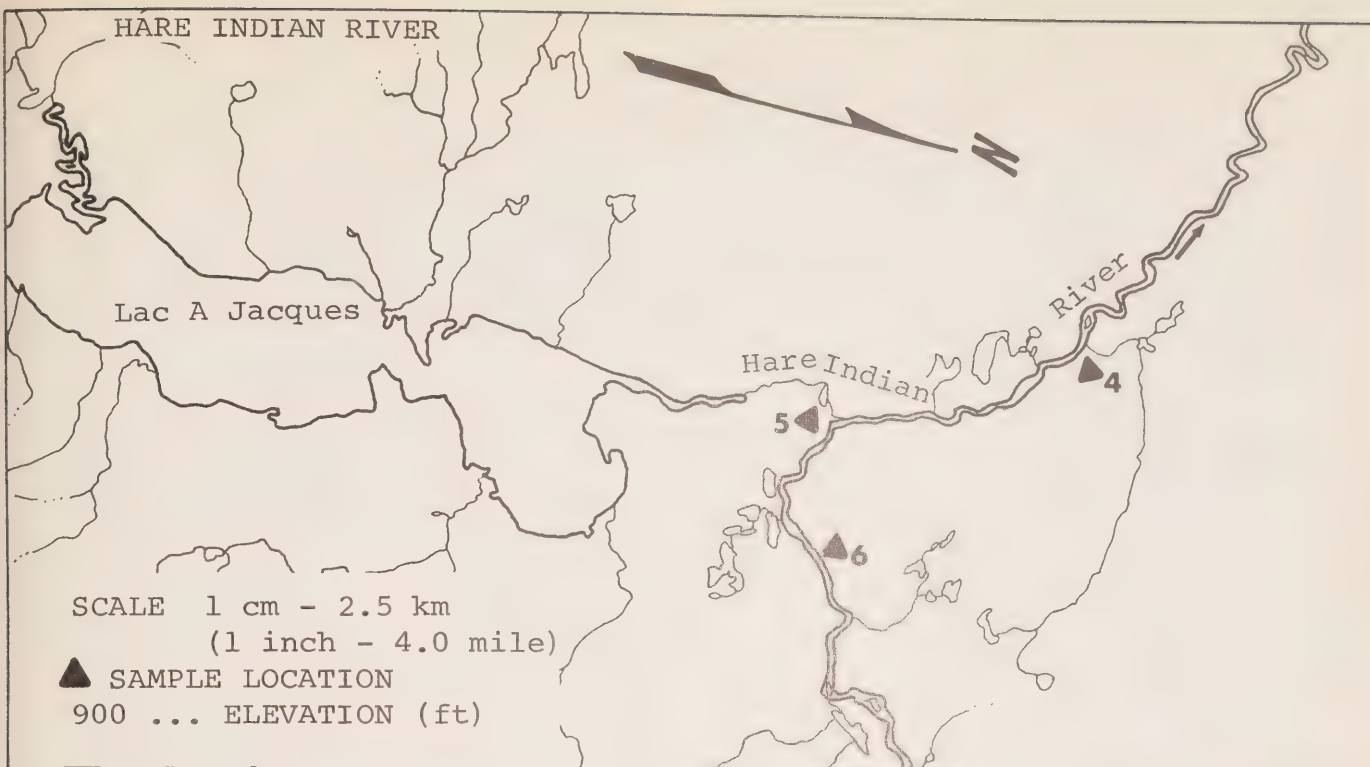
R₁ ... 

R₂ ... 

S₁ ... 

S₂ ... 

S₃ ... 



HARE INDIAN RIVER

Total length 151 miles; drainage area 8,951 sq miles.

Watercourse Type

This is a single channel river with its headwaters in the Colville Hills and its lower reaches running through the Anderson Plain. Near the mouth of the river, the riverbed is composed of fine sand and silt. Both coarse and fine gravel extend the rest of the river's length. The river width (time of visit, 19-06-72) is generally between 120 feet and 150 feet from its mouth to the junction with the Bluefish River. The river has a wide flood plain. The water remains relatively clear throughout the year.

Riverbank Conditions

The riverbank is generally low and stable. The south bank at the 2+ mile mark is 60 feet high, on a 30° slope, and well treed.

The S₂ region from 6 miles to 9 miles has 20 to 30 foot high banks, with minor slope failures which expose the underlying clay material. The S₂ region just downstream of the confluence with the Bluefish River has a 60° slope with evidence of solifluction (drunken trees) and minor slumping.

The S₃ region at the Bluefish River mouth lies within an old burn area. The river bank shows very heavy slumping and tree movement. Overland run-off has formed deep gullies in the bank.

The upper reaches of the river have a very heavy meander with many oxbows, low banks and a wide flood plain which shows little evidence of recent flooding.

Flow Conditions

Date: 19-06-72
 Location: Station 2
 Estimated width: 120 feet
 Estimated current: 3 fps

Assessment of the Fish Resources

Residents at Fort Good Hope report that grayling move out of Lac a Jacques in the spring, in order to spawn in the Hare Indian River. The numbers of grayling and longnose sucker caught in the Hare Indian River indicate that it is an important nursery area. Lac a Jacques supports grayling, whitefish, burbot and pike. The mouth of the Hare Indian River is fished domestically throughout the summer season and to a limited degree during the winter months.

Sample Location Data: Hare Indian River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-72 June 18	unknown	heavy silt	5 7	gill net	negative		
#1-72 Oct. 12	gravel silt	light rust	2 1		broad whitefish humpback whitefish	1 4	mature mature
#2-71 July 10	gravel	clear	24 16	seine	grayling white sucker burbot	12 2 1	immature immature immature
#2-71 Aug. 06	gravel	clear	10 14		grayling slimy sculpin humpback whitefish lake chub longnose sucker	2 1 1 300 200	immature immature immature mature immature
#2-71 Sept. 18	gravel	light rust	6 7	seine	lake chub longnose sucker	61 5	mature immature

Sample Location Data: Hare Indian River Cont'd

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#2-72 June 19	gravel	light rust	19 12	seine	lake chub slimy sculpin longnose dace grayling	5 2 1 3	mature immature immature immature
#3-71 July 09	gravel	clear	23 14	seine	slimy sculpin grayling lake chub	2 4 2	immature immature immature
				observed angling	pike negative	1 -	mature --
#3-71 Aug. 06	gravel	clear	10 16	seine	lake chub grayling slimy sculpin	10 3 3	immature immature immature
#3-71 Sept. 17	gravel	light rust	9 7	seine	humpback whitefish	1	immature
#3-72 June 18	gravel	light silt	5 6	gill net	negative		
#4-72 June 18	unknown	light silt	4 8	gillnet	negative		
#5-72 June 18	unknown	light silt	5 5	gill net	negative		
#6-71 July 10	gravel	clear	22 16	seine	grayling slimy sculpin	11 2	immature immature
#6-71 Aug. 06	gravel	clear	12 12	seine	grayling longnose sucker	30 8	immature immature
#6-71 Sept. 18	gravel	light rust	5 6	seine	grayling lake chub slimy sculpin	135 4 5	immature mature immature

Sample Location Data: Hare Indian River Cont'd

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#6-72			5				
June 19	gravel	light rust	6	seine	lake chub	5	mature
					longnose sucker	1	immature
					slimy sculpin	6	immature
					longnose dace	1	immature
					grayling	4	immature
					white sucker	2	immature

RAMPARTS RIVER

MACKENZIE RIVER

1

N

Ramparts River

SCALE: 1 cm - 2.5 km
(1 inch - 4.0 mile)

▲ SAMPLE LOCATION

900 ... ELEVATION (ft)

R₁ ... 

R₂ ... 

S₁ ... 

S₂ ... 

S₃ ... 

RAMPARTS RIVER

SCALE: 1 cm - 2.5 km
(1 inch - 4.0 mile)

▲ SAMPLE LOCATION

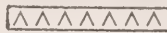
900 ... ELEVATION (ft)

R₁ ... 

R₂ ... 

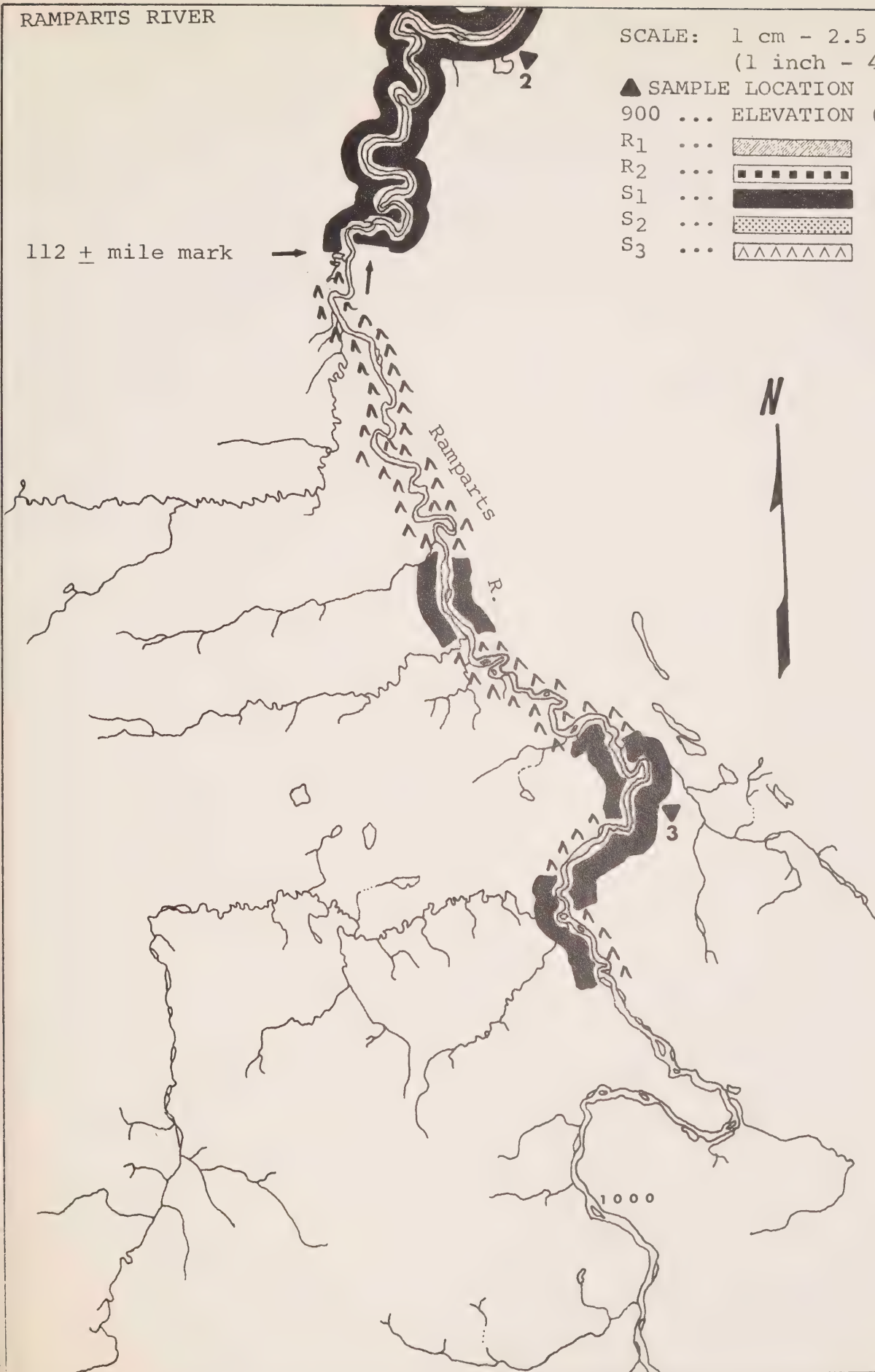
S₁ ... 

S₂ ... 

S₃ ... 

112 ± mile mark →

N



RAMPARTS RIVER

Total length 194 miles; drainage area 4,125 sq miles.

Watercourse Type

This is a sand bed river having an extremely tortuous meander through its lower reaches. Although the river is a non-mountain river, the headwaters are located in the Mackenzie Mountains. The lower reaches of this river flow through a muskeg area which is heavily dotted with stagnant lakes and pools. With the exception of the river mouth the river bottom is very heavily silted. The river is subject to flooding following summer rainstorms.

Riverbank Conditions

The lower 24 miles of riverbank are generally low (2 to 3 feet above the water surface). The surrounding terrain slopes slightly toward the river. At approximately the 18 mile mark there is a 40 foot high clay bank showing toe failure.

From the 24 mile mark to approximately the 100 mile mark extreme bog and swamp conditions occur. The river throughout this region meanders heavily and reforms its channel often. Undercut banks, mud flows, slump and tree falls are common. The river water through this stretch is very silty.

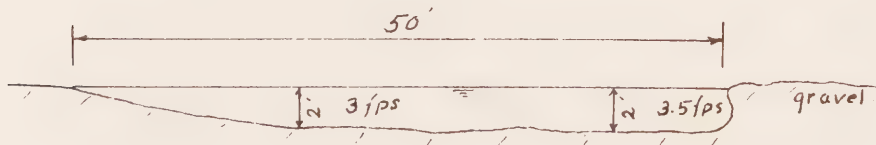
The region from the 100 mile mark to the 112 mile mark (shown on map 2 arrow) encompasses the change over from swamp to canyon. The banks are generally low and the meander is more controlled.

The river upstream from the 112 mile mark flows along a wide valley. The valley walls range in shape from 40 feet high, 60° slope (clay) at the 112 mile mark to 90 feet high and vertical near Station 3. There are extensive gravel deposits in these upper reaches along with evidence of ice damage to the flood plain trees.

Flow Conditions

Date: 22-06-72

Location: Station 3

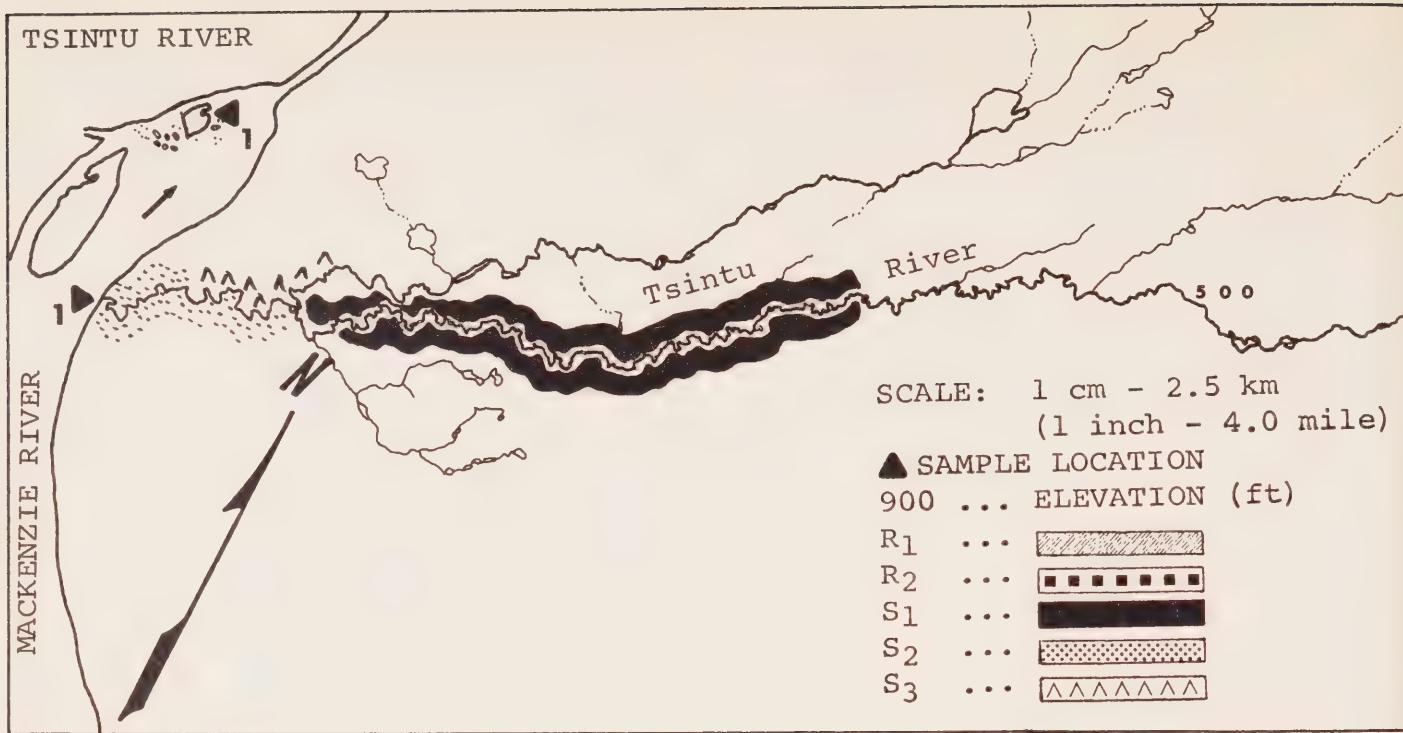


Assessment of the Fish Resources

Due to very limited catches by gill net and seine in this river, the fisheries potential cannot be fully assessed. The region of the river best suited for fish spawning and nursery areas would appear to be upstream of the 112 mile mark where gravel becomes the dominant bottom type.

Sample Location Data: Ramparts River

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-71 July 06	boulders	green	22 19	angling gill net	negative flathead chub	2 ripe
#1-71 Aug. 06	boulders	heavy silt	19 12	gill net	flathead chub	2 mature
#1-71 Sept. 16	boulders	heavy silt	11 8	negative		
#2-71 July 07	silt sand	heavy silt	21 17	seine	lake chub white sucker	1 immature 2 immature
#2-71 Aug. 06	silt sand	heavy silt flooded	18 12	negative		
#2-71 Sept. 16	silt sand	heavy silt flooded	11 8	negative		
#3-71 July 07	boulders gravel	green	22 18	seine	slimy sculpin grayling	1 immature 2 immature
#3-71 Aug. 06	gravel	heavy silt flooded	19 12	negative		
#3-71 Sept. 16	gravel silt	heavy silt	11 5	seine	lake chub slimy sculpin longnose sucker	4 immature 1 immature 3 immature
#3-72 June 22	gravel silt	heavy silt	18 12	seine	negative	



TSINTU RIVER

Total length 48 miles; drainage area 528 sq miles.

Watercourse Type

This is a single channel, non-mountain river. The meander pattern is very active but contained within a narrow meander belt. The lower reaches of this river flow through a deep gully while the upper reaches flow through a muskeg area with gentle slopes. The lower portions of the Tsintu River have a large boulder-coarse gravel type of bottom, while further upstream the river bed is composed of fine gravel and sand.

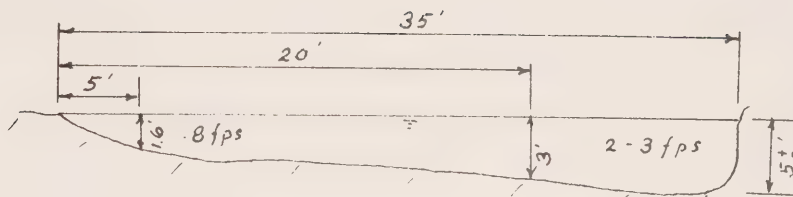
Riverbank Conditions

The lower 5 miles of river flow through a deep well-treed gully. The valley walls in this section are steep and high. There are many examples of high (50 to 100 foot) vertical, clay banks.

From approximately the 5 miles mark to the headwaters the Tsintu River becomes a small muskeg creek with low banks.

Flow Conditions

Date: 22-06-72
 Location : Station 1



Location : 10+ miles upstream from mouth.
 Estimated width: 70 feet
 Estimated depth: 1 to 2 feet
 Estimated velocity: 1 - 2 fps

Assessment of the Fish Resources

The lower reaches of the Tsintu River are utilized by yellow walleye and longnose suckers for spawning purposes and nursery areas.

The cyprinid lake chub are also very common in the mouth region. Due to low water levels (6 inches to 12 inches) at the mouth in September, October, there appears little likelihood of access to the river for fall spawning fish.

The Mackenzie River, Ramparts are fished domestically by residents of Fort Good Hope throughout the summer and fall months. The peak fishing occurs during the period of mid-August to late September. Major fish species encountered are inconnu, whitefish spp., burbot and Arctic cisco.

Sample Location Data: Tsintu River

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-71 July 07	boulders gravel	clear	21 16	negative		
#1-71 Aug. 08	boulders gravel	dark rust	19 15	seine	lake chub walleye longnose sucker	19 immature 24 immature 18 immature

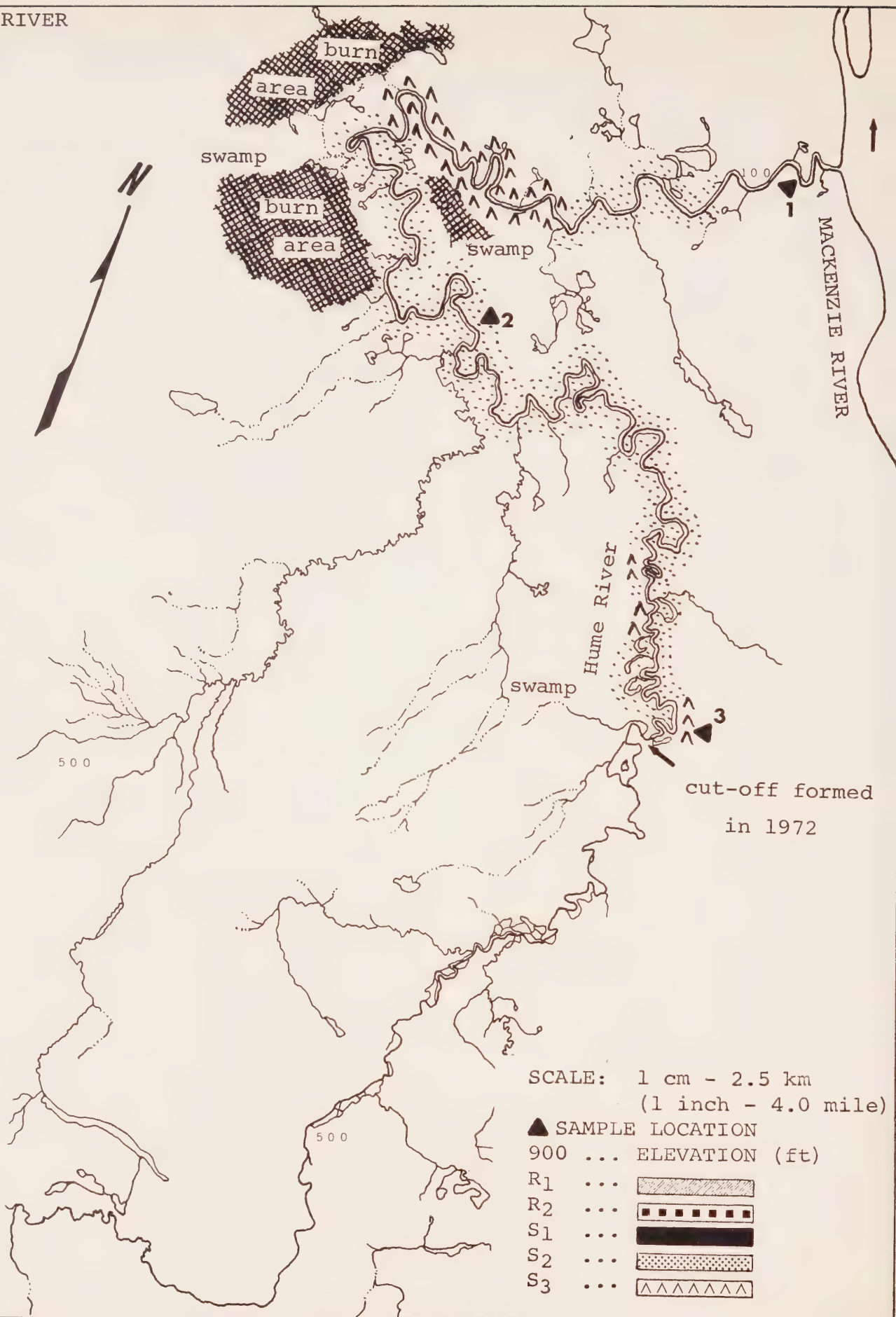
Sample Location Data: Tsintu River Cont'd

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-71 Sept. 15	boulders gravel	dark rust	12 6	seine	lake chub longnose sucker	27 immature 16 immature
#1-72 June 19	boulders gravel	light silt	18 13	gill net	walleye humpback whitefish	3 immature 1 mature
#1-72 June 22	boulders gravel	light rust	18 14		seine negative	
#1-72 Sept. 25	gravel	light rust	5 2	seine	lake chub slimy sculpin	50 mature 1 immature

Sample Location Data: Mackenzie River, Ramparts

#1-72 Oct. 13	bedrock silt	light silt	3 1	gill net	Arctic cisco	10 ripe
					grayling	3 mature
					walleye	1 mature
					least cisco	1 mature
					inconnu	1 immature

HUME RIVER



HUME RIVER

Total length 122 miles; drainage area 1,976 sq miles.

Watercourse Type

This is a single channel, non-mountain lake controlled river. This control feature is exerted by the extreme swamp conditions through the lower half of the river's length. Also contributing to the control aspect is the extreme meander of the river with its many cut-offs and oxbow lakes. There was very little gravel observed. The upper reaches of this river are subject to rapid fluctuations in water depth following summer rainstorms.

Riverbank Conditions

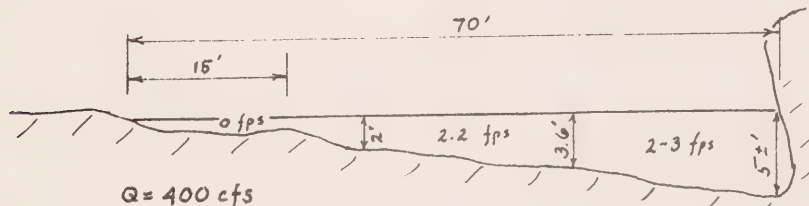
For the most part this river is classified in the S₂ category. Swamp and very unstable meander are the major causes of this classification. The river banks through these regions are generally low (2 feet to 4 feet above river level) with sections of 6 feet to 10 feet undercut clay banks.

A large portion of the middle reaches traverses an old burn area where mud flows and small slumps are very common even on flat terrain.

S₃ conditions exist from approximately mile 10 to mile 18. Here the river has 60 foot valley walls on a slope of 30° - 40°. Large mud flows and partial slumps are very common through this region. Several of these failures are blocking off one-half the river. The river is very silty in this area.

Flow Conditions

Date: 22-06-72
Location: Station 3



Assessment of the Fish Resources

Any gravel deposits in this river which could be used for spawning are very valuable because of the general scarcity of gravel.

Sample Location Data: Hume River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 July 07	sand silt	green	22 18	gill net	white sucker pike	1	ripe
						1	ripe
#1-71 Aug. 06	Location flooded.						
#1-71 Sept. 15	Location flooded.						
#1-72 June 19	mud silt	heavy silt	13 12	gill net	flathead chub	2	ripe
#2-71 July 07	gravel	green	19 18	seine	lake chub	3	immature
#2-71 Aug. 06	gravel	heavy silt	15 11	seine	lake chub	42	mature and immature
					longnose sucker	11	immature
					trout perch	1	immature
#2-71 Sept. 15	gravel silt	heavy silt	10 6	seine	lake chub	12	immature
					longnose sucker	1	immature
					trout perch	3	immature
Location 2 not sampled in 1972							
#3-71 July 06	gravel silt	green	22 18	seine	lake chub	41	immature
					trout perch	1	immature
					white sucker	1	immature
#3-71 Aug. 06	gravel	heavy silt	18 11	Location flooded.			
#3-71 Sept. 15	gravel silt	heavy silt	12 5	seine	lake chub	163	mature and immature

Sample Location Data: Hume River Cont'd

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#3-71 (Cont'd) Sept. 15					grayling trout perch pike	3 immature 1 immature 1 immature
#3-72 June 22	gravel sand	heavy silt	15 13	seine	longnose sucker lake chub	1 immature 9 immature

Sample Location Water Chemistry

Location 3

Date: 22-06-72

Temperature (C): Air-Water: 15;13

Dissolved Oxygen (D.O.): 9ppm

pH: 8.0

Alkalinity: Total (CaCO₃): 85.5ppmHardness : Total (CaCO₃): 119.7ppm

MOUNTAIN RIVER

SANS SAULT
RAPIDS

MACKENZIE R

burn
areaburn
area

Mountain River

Imperial Hills

Gayna River

1000

500

2

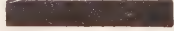
1000

Carcajou Range

SCALE: 1 cm - 2.5 km
(1 inch - 4.0 mile)

▲ SAMPLE LOCATION

900 ... ELEVATION (ft)

R₁ ...R₂ ...S₁ ...S₂ ...S₃ ...

MOUNTAIN RIVER

Total length 204 miles; drainage area 8,507 sq miles.

Watercourse Type

This is a sand bed, multi-channeled river. There are numerous gravel bars and islands. The gravel contains a high percentage of large size (three inches to six inches diameter) stones. The headwaters of this river are in the Carcajou Mountain Range. Massive alluvial fans were observed along the edge of this range. Evidence of previous flash flooding is indicated by the many flattened trees on the flood plain.

Riverbank Conditions

The lower 12 miles of the Mountain River have generally low riverbanks and a flat surrounding terrain. Within this area are several small regions of 10 foot exposed clay banks. The lower reaches of this river flow through an old burn area.

From approximately the 12 mile mark to the 34 mile mark the riverbanks steadily increase in height until the river is flowing between 200 foot high bed-rock cliffs (near the confluence of the Gayna River). The S_3 conditions shown downstream of the Gayna confluence involve 120 foot clay and shale banks on a 60° slope. Immediately upstream of the Gayna junction on the west bank is a massive 150 foot wide slump which spills into the river.

The R_1 region shown near the 50 mile mark consists of 300 foot vertical exposed shale cliffs. There is little evidence of instability or weathering.

Flow Conditions

Date: 14-06-72

Flow estimates were impractical because of the extreme width of river and the many active channels. Current was noted as being fast.

Assessment of the Fish Resources

Based on the data obtained by the Norman Wells base and the synoptic base during 1971 and 1972, the Mountain River is known to support a great diversity of fish species. The more abundant species are longnose sucker, Arctic grayling, Arctic cisco and lake chub. It seems likely that these species utilize the Mountain River for spawning. Other species caught, but in smaller numbers, were yellow walleye, whitefish, burbot and northern pike.

Throughout most of the summer months (June to mid August) the Mountain River is swiftly flowing and carries a heavy silt load (due to run off from the mountains during summer rains). From mid-August to freeze-up the river gradually clears. This condition is important for fall spawning (Arctic cisco).

Sample Location Data: Mountain River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 July 05	gravel silt	heavy silt	18 15	seine	grayling lake chub white sucker	16 6 2	immature immature immature
#1-71 Aug. 01	gravel silt	heavy silt	16 17	seine	longnose sucker lake chub slimy sculpin	21 41 1	immature immature immature
#1-71 Sept. 14	gravel	dark rust	8 7	seine	longnose sucker lake chub slimy sculpin	10 1 1	immature immature immature
#1-72 June 14	boulders gravel silt	heavy silt	20 12	seine	lake chub slimy sculpin	19 1	immature immature
#2-71 July 05	gravel silt	heavy silt	14 11	seine	lake chub white sucker	6 6	immature immature
#2-71 Aug. 01	gravel	heavy silt	16 15	seine	grayling	1	immature
#2-71 Sept.	gravel silt	light silt	12 7	seine	longnose sucker	3	immature

Location 2 not sampled in 1972 due to flooding.

CARCAJOU RIVER

SCALE: 1 cm - 2.5 km
(1 inch - 4.0 mile)

▲ SAMPLE LOCATION

900 ... ELEVATION (ft)

R ₁	...	
R ₂	...	
S ₁	...	
S ₂	...	
S ₃	...	



CARCAJOU RIVER

Total length 119 miles; drainage area 2,844 sq miles.

Watercourse Type

This is a sand bed, non-lake controlled river. The headwaters of the Carcajou and several of its major tributaries are in the Mackenzie Mountains. The lower reaches of this river flow through a low and flat terrain. There are many oxbows and silt bars. Numerous islands occupy the main river channel. The upper reaches of the river are incised within deep canyons. The mountain drainage has resulted in extensive fan formations containing large amounts of washed gravel.

Riverbank Conditions

The lower 36 miles of the river has low banks and an extensive meander activity. The few S₃ conditions noted on the map are typically 40 foot exposed clay banks on a steep slope. The surrounding terrain is densely treed.

The reach from the 36 mile mark to Station 3 was not followed closely. Seen from a distance however, it resembled the typical progression from a low profile terrain to a canyon-mountain headwater.

Flow Conditions

Date: 14-06-72
Location: Station 2

Cross-sectioning was impractical due to swift current.

Estimated width of main channel:	150 feet
Estimated depth	: 3 to 5 feet
Estimated current	: 4 - 5 fps

Assessment of the Fish Resources

The Carcajou River is utilized by a number of fish species as a nursery area and presumably for spawning purposes. Based on numbers caught the more prevalent species are longnose sucker, whitefish spp., Arctic grayling, yellow walleye and cyprinids. Catches of adult fish near the mouth were low.

Sample Location Data: Carcajou River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 July 02	silt sand	heavy silt	17 17	seine	lake chub	126	mature and immature
					longnose sucker	40	immature
					ninespine		
					stickleback	1	immature
					humpback		
					whitefish	4	immature
Location 1 was discontinued in 1971 due to difficult working conditions on the silt bottom.							
#2-71 July 02	gravel	heavy silt	17 13	angling seine	negative lake chub	76	immature
					longnose sucker	3	immature
#2-71 July 31	silt sand	heavy silt	18 17	seine	longnose sucker	101	immature
					trout perch	50	immature
#2-71 Sept. 14	gravel silt sand	light silt	11 8	seine	lake chub	3	immature
					trout perch	2	immature
#2-72 June 14	gravel silt sand	heavy silt	22 13	seine	lake chub	17	immature
					slimy sculpin	1	immature
					trout perch	2	immature
#3-71 July 02	gravel	heavy silt	19 12	angling seine	negative lake chub	13	immature
#3-71 July 31	silt sand	heavy silt	25 13	seine	trout perch	2	immature
					slimy sculpin	5	immature
					lake chub	2	immature
					grayling	3	immature

Sample Location Data: Carcajou River Cont'd

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#3-71 Sept. 12	unclassified	light silt	7 6	seine	grayling longnose sucker lake chub	3 immature 1 immature 3 immature
#3-72 June 14	gravel silt	heavy silt	17 8	seine	humpback whitefish	1 immature

Sample Location Water Chemistry

Location 3

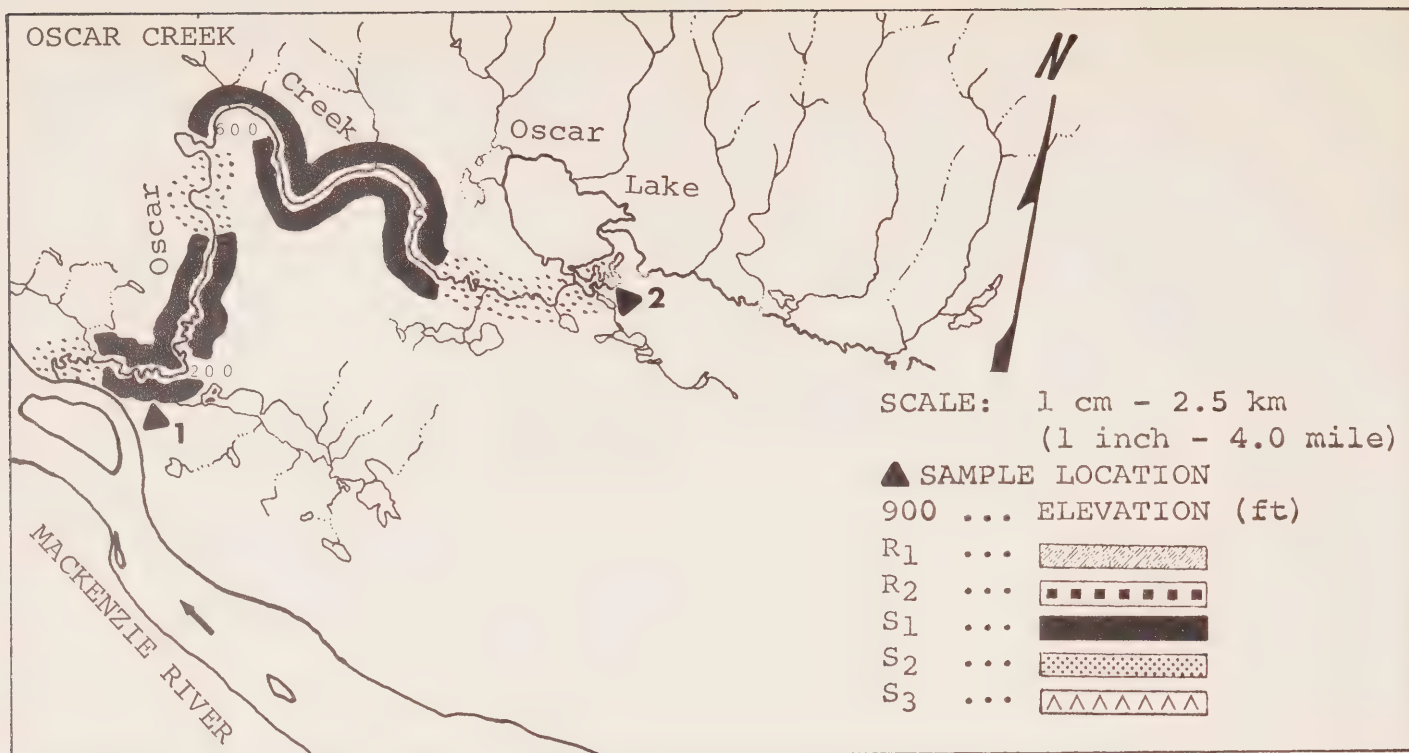
Date: 14-06-72

Temperature (C): Air-Water: 17;8

Dissolved Oxygen (D.O.): 11ppm

pH: 8.0

Alkalinity: Total (CaCO₃): 85.5ppmHardness : Total (CaCO₃): 85.5ppm



OSCAR CREEK

Total length 47 miles; drainage area 284 sq miles.

Watercourse Type

This is a single channel, sand bed river. Oscar Lake and the headwater swamp areas may act to regulate flood flows in Oscar Creek. Potential spawning gravel is abundant. The upper reaches of the river are quite silty and the lower reaches are much clearer.

Riverbank Conditions

The lower reaches (first 2+ miles) have low banks and tortuous meander. The poor drainage and slow infiltration rate in this area is shown by the many pools of water along seismic lines.

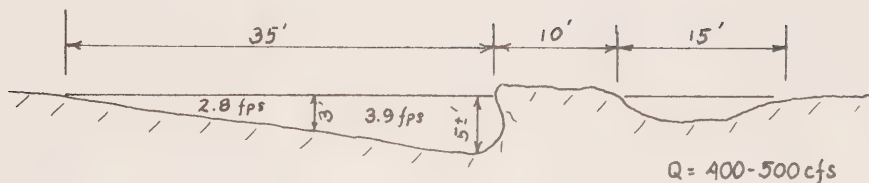
The section from 2 miles to 7 miles has low banks with heavy tree growth right to the river's edge.

From the 7 mile mark to the 10 mile mark Oscar Creek narrows and forms a series of small rapids. In this region the valley sides have a 30° slope and are fairly extensively gullied.

The four mile section of creek downstream of Oscar Lake is meandering and swampy. Mud slides and tree falls are common. Upstream of the lake, Oscar Creek becomes a maze of marshes.

OSCAR CREEK Cont'dFlow Conditions

Date: 14-06-72
 Location: Station 1

Assessment of the Fish Resources

The lower reaches of Oscar Creek appear ideally suited as spawning and nursery areas. The mouth of Oscar Creek is an important whitefish nursery area. Suspected fish runs of spring spawners include the species yellow walleye, northern pike, longnose sucker and Arctic grayling.

Sample Location Data: Oscar Creek

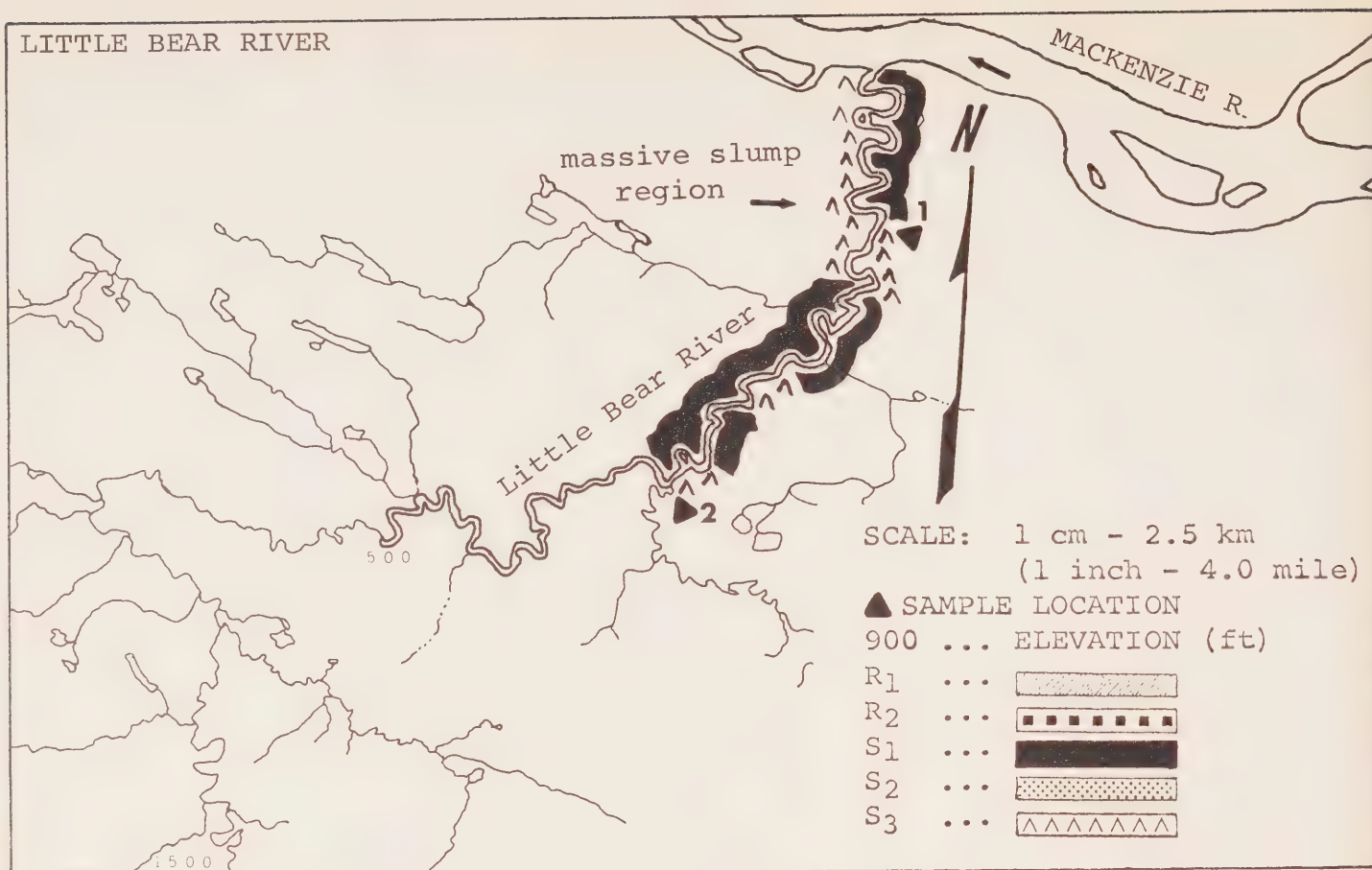
Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 Aug. 04	gravel sand	light rust	20	seine	grayling	2	immature
			14		longnose sucker	85	immature
					trout perch	6	immature
					longnose dace	3	immature
					slimy sculpin	1	immature
#1-71 Sept. 12	gravel	light rust	8	seine	grayling	1	immature
			8		slimy sculpin	1	immature
#1-72 June 14	gravel	light silt	20	seine	longnose sucker	1	immature
			9		sculpin sp.	1	immature
#1-72 Sept. 25	gravel	clear	5	seine	grayling	2	immature
			3		slimy sculpin	3	immature

Sample Location Data: Oscar Creek Cont'd

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-72 Cont'd Sept. 25					ninespine stickleback trout perch	1 immature 11 immature
#2-72 Sept. 24	silt	clear	5 2.5	gill net	pike	3 mature

Sample Location Water Chemistry

Location 1	Dates: 14-06-72	25-09-72
Temperature (C): Air-Water	20;9	5;3
Dissolved Oxygen (D.O.):	9ppm	12ppm
pH:	8.0	8.5
Alkalinity: Total (CaCO ₃):	85.5ppm	136.8ppm
Hardness : Total (CaCO ₃):	85.5ppm	256.5ppm



LITTLE BEAR RIVER

Total length 76 miles; drainage area 1,234 sq miles.

Watercourse Type

This is a single channel, non-mountain river, flowing through the Mackenzie Plain region. The riverbed contains large cobble and gravel regions throughout its entire length. The lower reaches of the river are generally well contained, with little flood plain. The upper reaches have wide gravel beaches. During the early part of the year there appears to be a fairly heavy silt load.

Riverbank Conditions

The lower 7 to 8 miles of this river have S₃ conditions on the undercut (west) side of the river. A typical riverbank in this stretch is 50 to 70 feet high, on a 60° slop and is composed of clay and sand. Mud flows and gullyng are very evident.

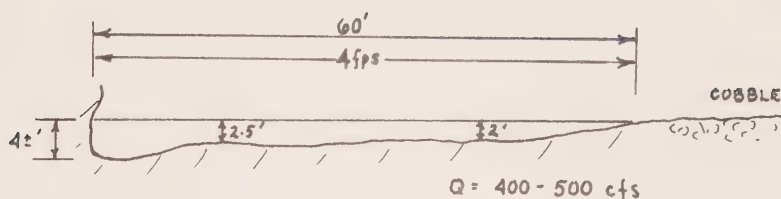
The reach of river from the 7 to 8 mile post to the confluence with the East Little Bear River flows through a wide valley with gentle well-treed slopes.

The east side of this river through its entire length displays minor bank undercutting and tree falls. The east side surrounding terrain has a low approach slope.

LITTLE BEAR RIVER Cont'dFlow Conditions

Date of Visit: 12-06-72

Location : Station 1

Assessment of the Fish Resources

The catch composition tends to indicate that this river is used by a variety of fish species. The river is an important nursery area and probable spawning ground for grayling, walleye, burbot and longnose sucker. Movements by fall spawners into or within this system are undefined. The river is seldom fished by natives as it tends to be swiftly flowing and shallow near the mouth.

Sample Location Data: Little Bear River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 July 03	gravel	light rust	18 15	seine	longnose sucker	1	immature
					lake chub	17	immature
					slimy sculpin	1	immature
					longnose dace	1	immature
#1-71 Aug. 05	gravel	heavy silt	18 11	seine	flathead chub	41	immature
					lake chub	300	mature and immature
					grayling	3	immature
					slimy sculpin	6	immature
					longnose sucker	95	immature
					burbot	6	immature
					humpback		
					whitefish	1	immature
					longnose dace	2	immature

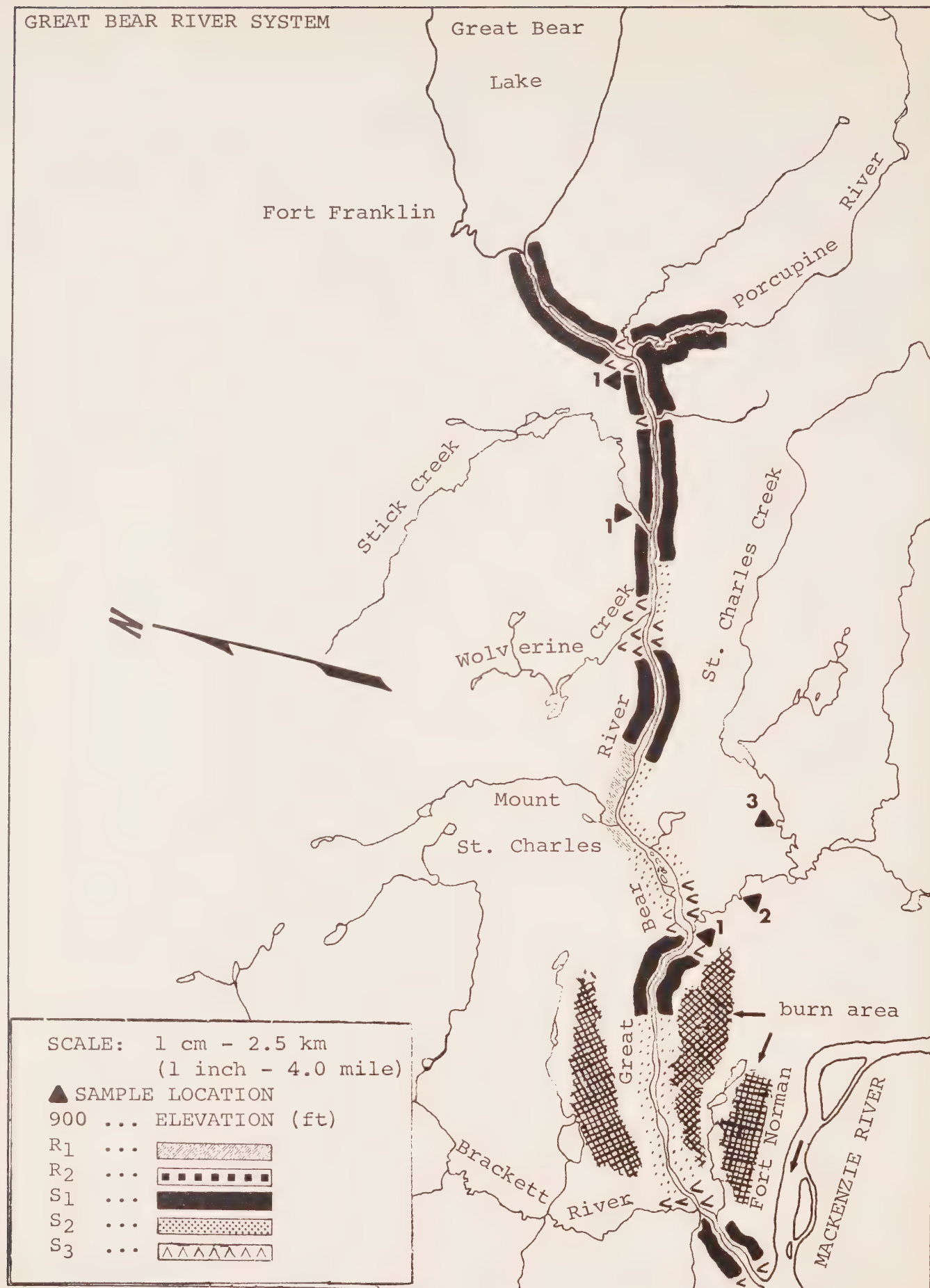
Sample Location Data: Little Bear River Cont'd

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 Sept. 10	gravel	heavy silt	13 6	seine	lake chub longnose sucker	44 1	immature mature
#1-72 June 12	boulders gravel	heavy silt	13 12	seine	longnose sucker	1	mature
#1-72 Sept. 25	gravel silt	light rust	7 5	seine	lake chub slimy sculpin grayling	29 7 1	immature immature immature
#2-71 July 03	gravel	light rust	19 12	seine	lake chub slimy sculpin	2 7	immature immature
#2-71 Aug. 05	gravel	light silt	18 9	seine	grayling longnose sucker lake chub	2 4 15	immature immature immature
#2-71 Sept. 10	gravel	heavy silt	11 6	negative			
#2-72 June 12	gravel silt	heavy silt	14 12	seine	lake chub slimy sculpin sculpin sp. grayling burbot longnose sucker	23 1 7 1 1 1	mature and immature immature immature immature immature
#2-72 Sept. 26	gravel silt	light rust	7 4	seine	slimy sculpin grayling	10 5	immature immature

LITTLE BEAR RIVER Cont'dSample Location Water Chemistry

Location 1	Dates: 12-06-72	26-09-72
Temperature (C): Air-Water:	13;12	7;5
Dissolved Oxygen (D.O.):	10ppm	14ppm
pH:	7.5	8.0
Alkalinity: Total (CaCO ₃):	51.3ppm	85.5ppm
Hardness : Total (CaCO ₃):	87.5ppm	196.7ppm

GREAT BEAR RIVER SYSTEM



GREAT BEAR RIVER

Total length 76 miles; drainage area 55,200 sq miles.

Watercourse Type

This is a sand bed, non-mountain river. Great Bear Lake occupies approximately 22% (Church, 1971) of the river system watershed and thus, is highly regulated with respect to flooding. The river is generally quite shallow except for a narrow sinuous channel used for barge traffic. The river bed material is gravel with a paving of cobbles and boulders. Nearly all of this gravel is very hard, tough material. It is composed mainly of crystalline rock including granite, quartzite etc. (G. E. Crippen & Associates Ltd., 1972). Considerable sand and gravel has silted into the mouth of the Great Bear River due to the backwater effects of the Mackenzie River. This river is extremely clear and cold throughout the year.

Riverbank Conditions

This river flows along the bottom of a gentle valley within a region of low relief. Riverbanks are generally low to the water, well vegetated and of stable appearance.

One of the exceptions to the rule occurs from the Brackett River confluence upstream to Mount St. Charles. At the Brackett River confluence there are several areas of weathered shale which have been exposed by slides. Proceeding upstream, through a burn area (both sides of the river) there are many minor slumps and mud flows into the river. At Mount St. Charles the exposed rock material appears sound and unweathered.

There are a number of S_3 areas indicated on the accompanying map. These areas include the St. Charles Creek mouth, Wolverine Creek mouth and the Great Bear River opposite the Porcupine River. All these regions consist of exposed gravel and shale on approximately 60° banks.

Flow Conditions

Date for all observations: 12-06-72

a) Great Bear River

The Great Bear River is both too wide and too cold to attempt cross-sectioning. Because of the extremely clear water even the depth of the river is deceptive.

b) Stick Creek (mouth)

Estimated width : 50 to 60 feet
Estimated depth : 2 to 3 feet
Estimated velocity: 4-6fps

Flow Conditions Cont'd

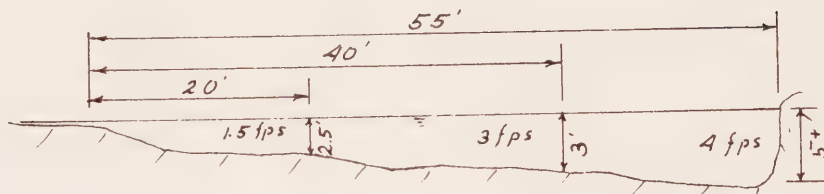
c) Porcupine River (mouth)

Estimated width : 100 feet

Estimated maximum depth : 5 feet

d) St. Charles Creek

Location 3

Assessment of the Fish Resources

The importance of the Great Bear River to the fisheries resource is that it serves as a probable migratory route for such major fish species as Arctic grayling, northern pike, Arctic cisco, round whitefish and possibly inconnu. Some areas of the system, particularly the tributaries, are suspected spawning and nursery areas for these species as well as for longnose suckers, burbot, lake chub, stickleback spp., and sculpin spp. Arctic grayling appear to utilize the Porcupine River and St. Charles Creek as spawning and nursery areas. In addition there appears to be a resident population in the Great Bear River throughout the year. Northern pike were present in most locations sampled and presumably spawn in many areas of the system. Round whitefish were captured during October on Great Bear River near the lake and at the Porcupine River mouth. It is suspected that they moved into the system from Great Bear Lake but further movements have not been defined. Reports of an inconnu movement in the Great Bear River have not been confirmed.

The Norman Wells base caught significant numbers of Arctic cisco at the mouth of the Great Bear River on the Mackenzie River during 1971. Arctic grayling fry were numerous at the mouth of the Brackett River. Movements of these fish have not been determined.

The Great Bear River is fished domestically near Fort Norman and periodically at the mouth of the Brackett River during the late summer and fall. Brackett Lake and Kelly Lake are fished domestically in the fall and early winter primarily for whitefish spp. There is little if any domestic fishing on the Great Bear River between the Brackett River and Great Bear Lake. Great Bear Lake is domestically and commercially fished primarily in the summer and fall.

Sample Location Data: St. Charles Creek

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 July 02	unclassified	dark rust	20 12	gill net	pike	1	mature
					grayling	1	mature
#1-71 Aug. 02	sand gravel	light silt	19 15	gill net	pike	5	mature
					grayling	1	mature
					humpback		
					whitefish	1	immature
				inconnu	2	ripe	
#1-71 Sept. 10	sand gravel	dark rust	10 9	gill net	pike	2	mature
Location 1 not sampled in 1972 due to flooding.							
#2-71 July 02	gravel sand	clear	20 11	seine angling	lake chub	28	immature
					negative		
#2-71 Aug. 02	sand	clear	23 19	seine	lake chub	54	mature and immature
					longnose sucker	72	immature
#2-71 Sept. 09	sand	dark rust	10 9	negative			
#3-72 June 12	gravel sand	light rust	11 11	seine	pike	1	immature
					sculpin sp.	2	immature
#3-72 Sept. 27	gravel	light rust	4 2	seine	lake chub	9	immature
					slimy sculpin	1	mature
					grayling	8	immature

GREAT BEAR RIVER Cont'dSample Location Water Chemistry: St. Charles Creek

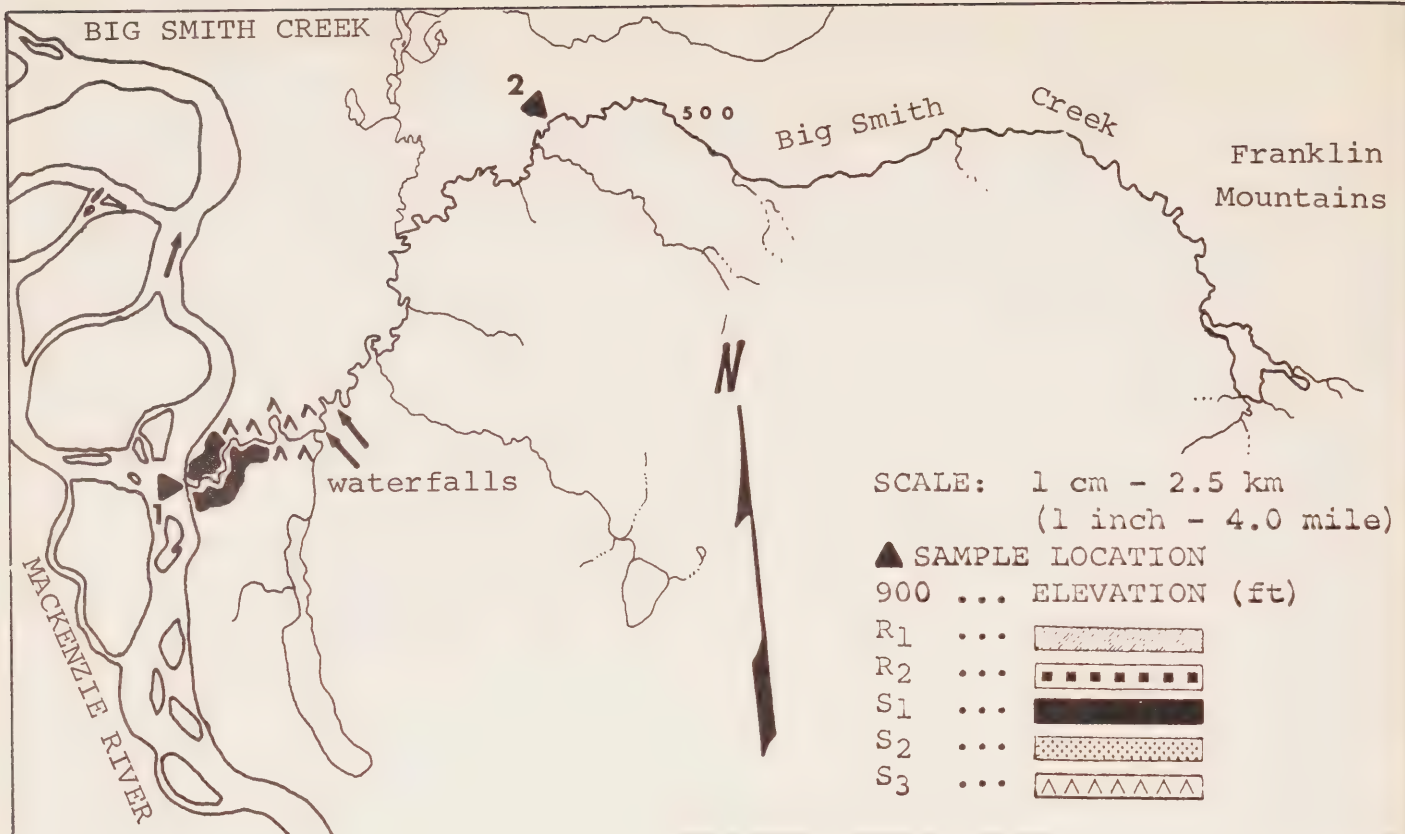
Location 3	Dates: 12-06-72	27-09-72
Temperature (C): Air-Water	11;11	4;2
Dissolved Oxygen (D.O.):	9ppm	13ppm
pH:	8.0	8.0
Alkalinity: Total (CaCO ₃):	51.3ppm	102.6ppm
Hardness : Total (CaCO ₃):	68.4ppm	119.7ppm

Sample Location Data: Stick Creek

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-72 June 12	gravel sand	clear	11 11	gill net	pike	5 ripe

Sample Location Data: Porcupine River

#1-71 July 07	gravel sand	clear	14 10	angling seine	pike pike grayling	3 mature 1 immature 9 immature
#1-71 Aug. 08	gravel sand	light rust	18 17	seine	grayling ninespine stickleback	1 immature 17 mature and immature
#1-71 Sept. 09	boulders gravel	dark rust	10 6	seine angling	ninespine stickleback grayling	2 immature 1 mature
#1-72 June 10	gravel sand	light rust	20 13	gill net angling seine	grayling negative ninespine stickleback	14 ripe and spent 1 mature



BIG SMITH CREEK

Total length 51 miles; drainage area 613 sq miles.

Watercourse Type

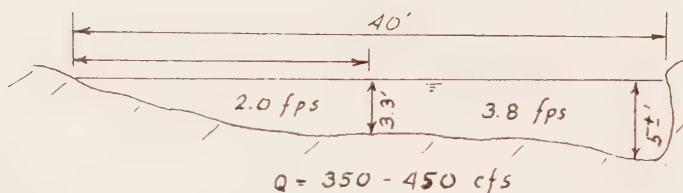
This is a single channel, non-mountain river. From approximately the 4 mile mark to the 6 mile mark the river flows through a rock gorge. Within this stretch there are several waterfalls with the largest being approximately 10 feet in height. Above the falls the river bottom consists of sand bars and shoals and below the falls the bottom is coarse gravel. The water is clear all year round.

Riverbank Conditions

S₃ conditions prevail through most of the gorge area because of the danger and evidence of rockfalls. The cliff material appears fractured in many places.

Flow Conditions

Date: 13-06-72
Location: Station 1



BIG SMITH CREEK Cnnt'dAssessment of the Fish Resources

Although apparently a nursery area for several fish species, data on Big Smith Creek is very limited. Movements of any fish into the river for spawning purposes are undefined. The river is not fished domestically.

Sample Location Data: Big Smith Creek

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 July 03	gravel	clear	21 17	seine	negative		
#1-71 July 31	gravel	light rust	23 17	negative			
#1-71 Sept. 10	gravel	dark rust	13 8	negative			
#1-72 June 13	gravel	dark rust	20 12	seine	lake chub longnose sucker slimy sculpin grayling trout perch mountain whitefish	9 3 1 2 1 3	mature immature immature immature immature immature
#1-72 Oct. 02	gravel	dark rust	3 2	seine	negative		
#2-71 July 03	gravel sand	clear	17 14	seine	negative		

Location 2 discontinued in 1971: area appears inaccessible to fish migration due to falls downstream.

Sample Location Water Chemistry

Location 1 Date: 13-06-72

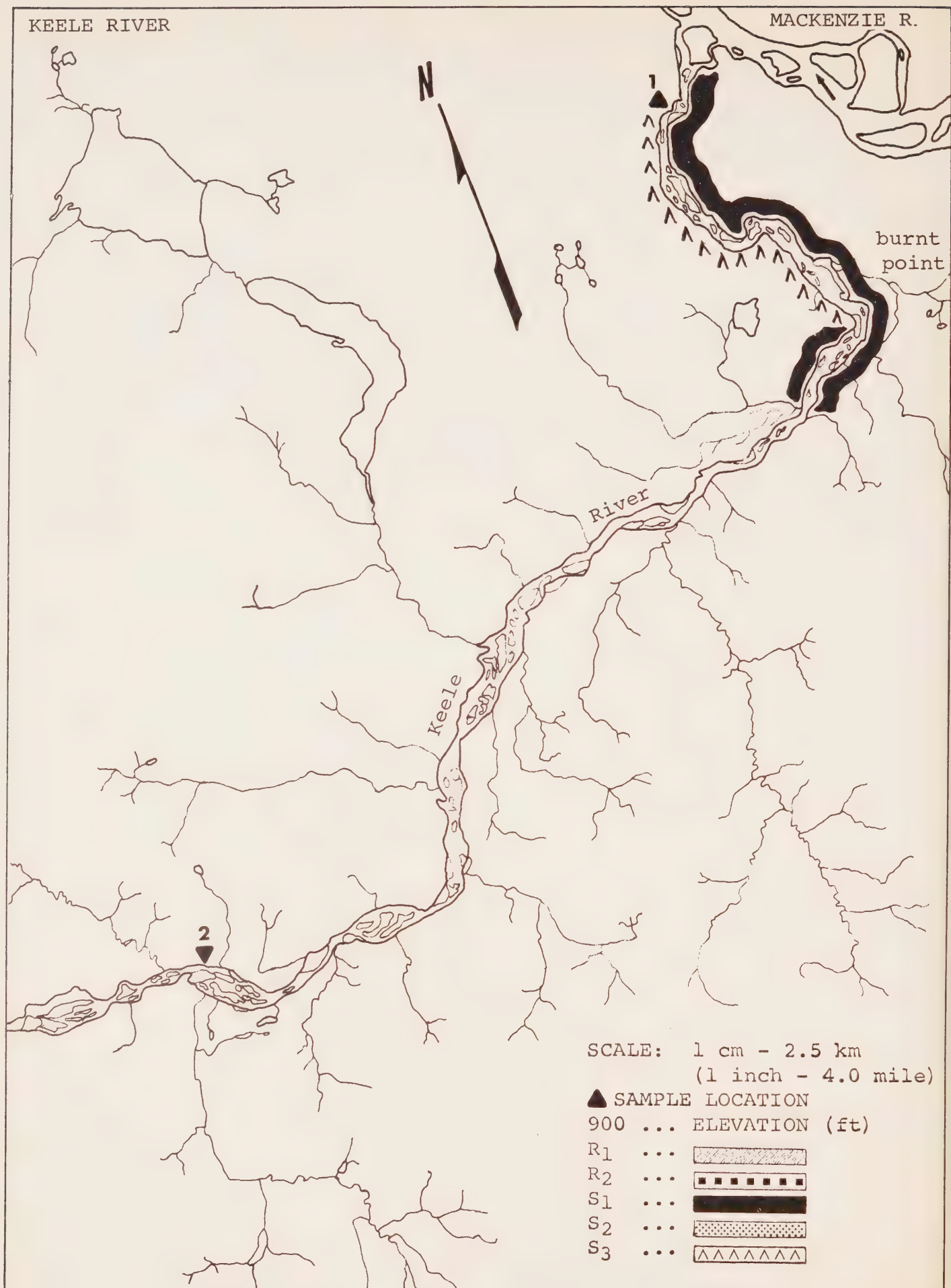
Temperature (C): Air-Water: 20;12

Dissolved Oxygen (D.O.): 11ppm

pH: 8.0

Alkalinity: Total (CaCO₃): 85.5ppm

Hardness: Total (CaCO₃): 85.5ppm



KEELE RIVER

Total length 247 miles; drainage area 9,476 sq miles.

Watercourse Type

Characteristic of many rivers flowing into the Mackenzie from the west, the Keele is a multi-channeled stream which is dotted with many islands and silt-gravel bars. It is a shallow stream with a fast current. It has a heavy silt load during the months of June to mid-August.

Riverbank Conditions

The lower 12 miles of river bank are generally stable on the east side and unstable on the west. The east side banks are low to the water and have a flat profile.

Along the west side the riverbank is high (200 feet near the mouth, 40 feet near the 12 mile mark) steep (50° - 70°) and displays slumping, mudflows and gullyng.

From the 12 mile mark to approximately the 14 mile mark, both sides of the river were low to the water and flat.

The riverbank survey was discontinued at approximately the 14 mile mark because of time limitations.

Flow Conditions

Not assessed due to the large width and many channels.

Assessment of the Fish Resources

For the period of June to mid-August the heavy silt and fast current of the Keele River have a limiting effect on sampling procedures. Seining was conducted in smaller side channels of the river. After mid-August the river gradually clears until by the end of September it is extremely clear and bottom composition (gravel) as well as deep pools are readily distinguishable. During this latter period catches were significantly increased and indicated that the river serves as a nursery area for Arctic grayling. The river may also serve as a overwintering area for such species as Arctic grayling, longnose suckers, burbot and possibly whitefish spp. Due to other survey priorities, late October sampling could not be conducted, thus, information on possible fall spawners in the Keele River is unknown. Any spring spawning of fish species, in particular Arctic grayling and longnose sucker, is likely to occur during river breakup in May before the silt load increases due to land runoff.

Sample Location Data: Keele River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 July 02	gravel	heavy silt	18 12	seine	longnose sucker burbot pike lake chub	1 1 1 1	immature immature immature immature
#1-71 July 31	boulders gravel	light silt	20 11	angling	negative		
#1-71 Sept. 10	gravel	green	10 8	seine	lake chub grayling	4 2	immature immature
#1-72 June 13	gravel	heavy silt	20 12	seine	grayling	1	immature
#1-72 Oct. 02	gravel	clear	4 2	seine	grayling lake chub	21 4	immature immature
#1-72 Oct. 04	gravel	clear	6 2	gill net	longnose sucker grayling	1 3	immature mature
#2-71 July 02	gravel silt	heavy silt	20 12	seine	negative		
#2-71 July 31	gravel	light silt	22 14	negative			
#2-71 Sept. 10	gravel silt	green	8 8	observed	grayling slimy sculpin	1 1	immature immature
#2-72 June 13	gravel	heavy silt	15 9	seine	negative		

Sample Location Data: Keele River Cont'd

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#2-72			3			
Oct. 02	gravel	clear	1	seine	grayling	1 immature
					slimy sculpin	1 mature

Sample Location Water Chemistry

Location and Date #1 - 13-06-72

#2 - 02-10-72

Temperature (C): Air-Water: 15;9

4;2

Dissolved Oxygen (D.O.): 11ppm

13ppm

pH: 8.0

8.5

Alkalinity: Total (CaCO₃): 119.7ppm

153.9ppm

Hardness: Total (CaCO₃): 119.7ppm

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REDSTONE RIVER



REDSTONE RIVER

Total length 180 miles; drainage area 9,408 sq miles.

Watercourse Type

This is a sand bed river with its headwaters in the mountains. There are no flood control features. This river is multi-channeled with areas of delta formations and islands. Gravel bars were evident along the entire length of the river. Most of the channels which carry water in early summer dry up by the end of August.

Riverbank Conditions

The lower 18 miles of river appeared to have an equal division between stable areas (S_1) and unstable areas (S_3). As with the Keele River, the higher river banks occur near the mouth of the river and tend to diminish progressively on moving upstream. The section from the 8 mile mark to the 10 mile mark (on the east bank) consists of 100 foot shale and gravel banks on a 60° slope. There are numerous gravel slides through these two miles. The S_3 conditions around the 18 mile mark result from 30 foot to 40 foot mud banks on a 40° slope. Gullying and overland run-off into the river are evident.

The river stretch from mile 32 to mile 41 contains a wide flood plain, flat shale beaches and a gently sloping valley floor. The surrounding terrain is heavily treed. The total river width through this section ranges from 150 feet to 300 feet.

At approximately mile 41 the south bank consists of 150 foot vertical rock cliffs. There is evidence of jointing, and weathering. Several rock slides were also noted.

Flow Conditions

Date:	13-06-72
Location:	Station 2
Estimated width:	150 to 200 feet (one channel)
Estimated velocity:	4 - 5 fps

Assessment of the Fish Resources

Insufficient catch data obtained from this river make an estimate of the fish resource inconclusive. Turbidity conditions similar to the Keele River exist on the Redstone River i.e. silty throughout the summer months with gradual clearing in the fall until by late September the water is clear. There are many areas of excellent gravel shoals and pools where fish spawning could occur.

Sample Location Data: Redstone River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 July 01	gravel	heavy silt	21 13	seine	flathead chub broad whitefish	3 2	immature immature
#1-71 July 30	gravel	green	17 15	negative			
#1-71 Sept. 10	gravel	green	17 9	angling	negative		
#1-72 June 13	gravel	heavy silt	22 13	seine	negative		
#2-71 July 01	gravel	heavy silt	20 12	negative			
#2-71 July 30	boulders	light silt	18 13	negative			
#2-71 Sept. 04	boulders	green	17 9	angling	negative		
#2-72 June 13	gravel	heavy silt	17 11	seine	slimy sculpin	1	immature

Sample Location Water Chemistry

Location 2

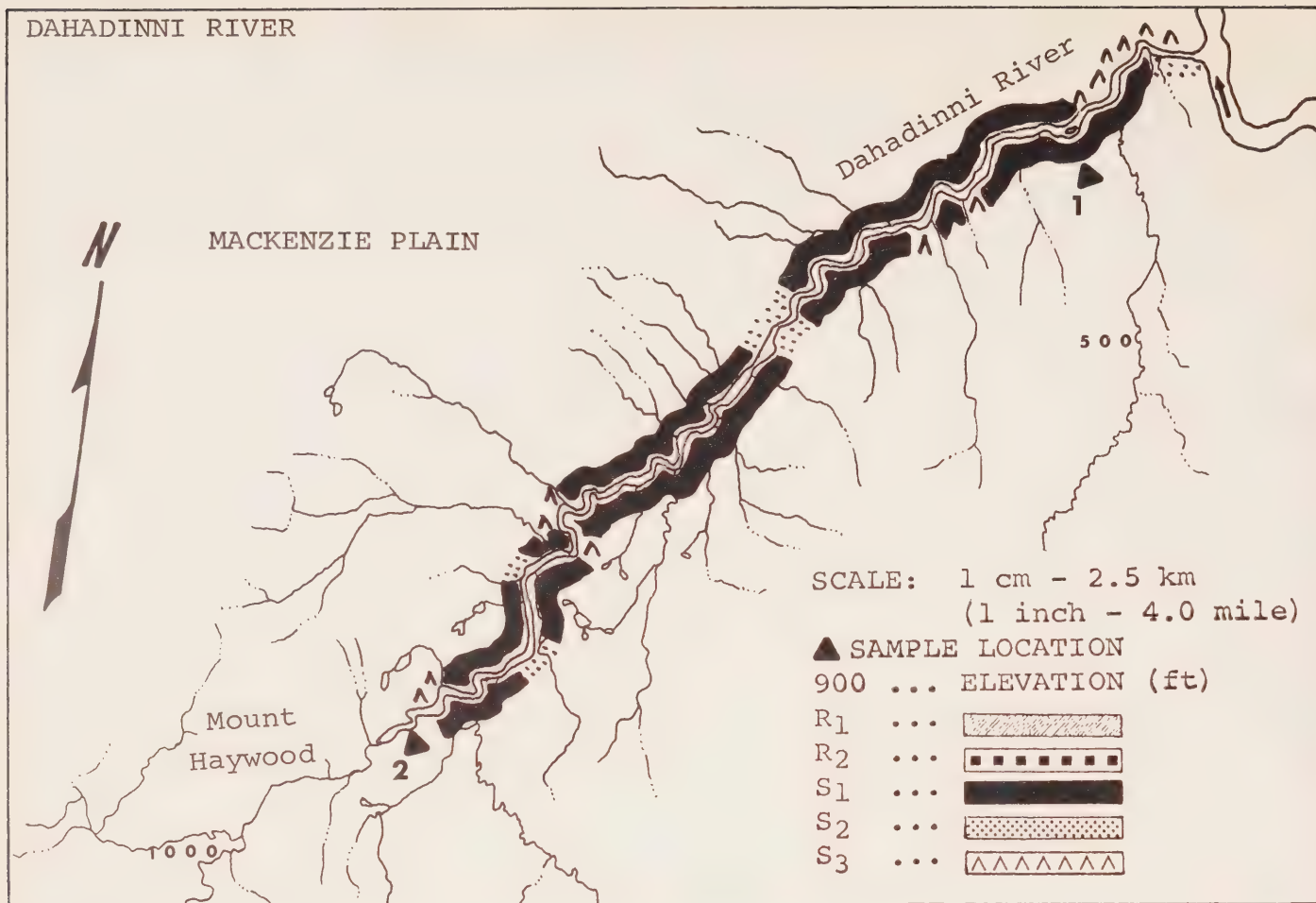
Date: 13-06-72

Temperature (C): Air-Water: 17;11

Dissolved Oxygen (D.O.): 9ppm

pH: 8.0

Hardness: Total (CaCO₃): 136.8ppm



DAHADINNI RIVER

Total length 85 miles; drainage area 1,533 sq miles.

Watercourse Type

This is a sand bed, non-mountain river. There are no flood control features. The river exhibits a controlled meander. Clean gravel is found throughout the river. The shoreline is also gravel. The river is generally narrow with many shallow areas and riffles.

Riverbank Conditions

The lower 4 miles of river bank (north side) are between 100 feet and 150 feet high and steep. The bank material consists of bedrock and shale. There is evidence of slumping.

Generally the riverbanks are low and on a very gentle slope. Interspersed along the stable areas are S₃ areas which are exposed shale cut banks (i.e. on the outside edge of a meander bend). The S₂ regions shown on the map are typically 40 foot banks on a 30° - 40° slope. Mud flows, solifluction and tree falls are common.

Flow Conditions

Date:	13-06-72
Location:	Station 2
Estimated width:	40 feet
Estimated depth:	1 - 2 feet
Estimated mean velocity:	4 fps

DAHADINNI RIVER Cont'dAssessment of the Fish Resources

Despite the fact that catch data in this river was relatively low in 1971 and 1972, it is probable that upstream conditions (Station 2) support an Arctic grayling nursery area. Fall spawning fish species may enter the river when its waters clear in September and October. The presence of gravel shoals and pools throughout the length surveyed increases the fishery potential of this river.

Sample Location Data: Dahadinni River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 July 01	boulders	heavy silt	22 12	seine	broad whitefish lake chub	1 3	immature mature
#1-71 July 30	boulders	green	20 15	negative			
#1-71 Sept. 04	boulders	dark rust	19 12	negative			
#1-72 June 13	gravel	light silt	22 15	seine	lake chub	3	mature
#2-71 July 01	gravel	heavy silt	18 13	seine hand	negative unknown	2	fry
#2-71 July 30	gravel	light silt	16 15	seine	negative		
#2-71 Sept. 04	gravel	green	16 9	seine	grayling	1	immature
#2-72 June 13	gravel	light silt	20 15	seine	grayling lake chub	2 3	immature mature

Sample Location Data: Dahadinni River Cont'dSample Location Water Chemistry

Location 2

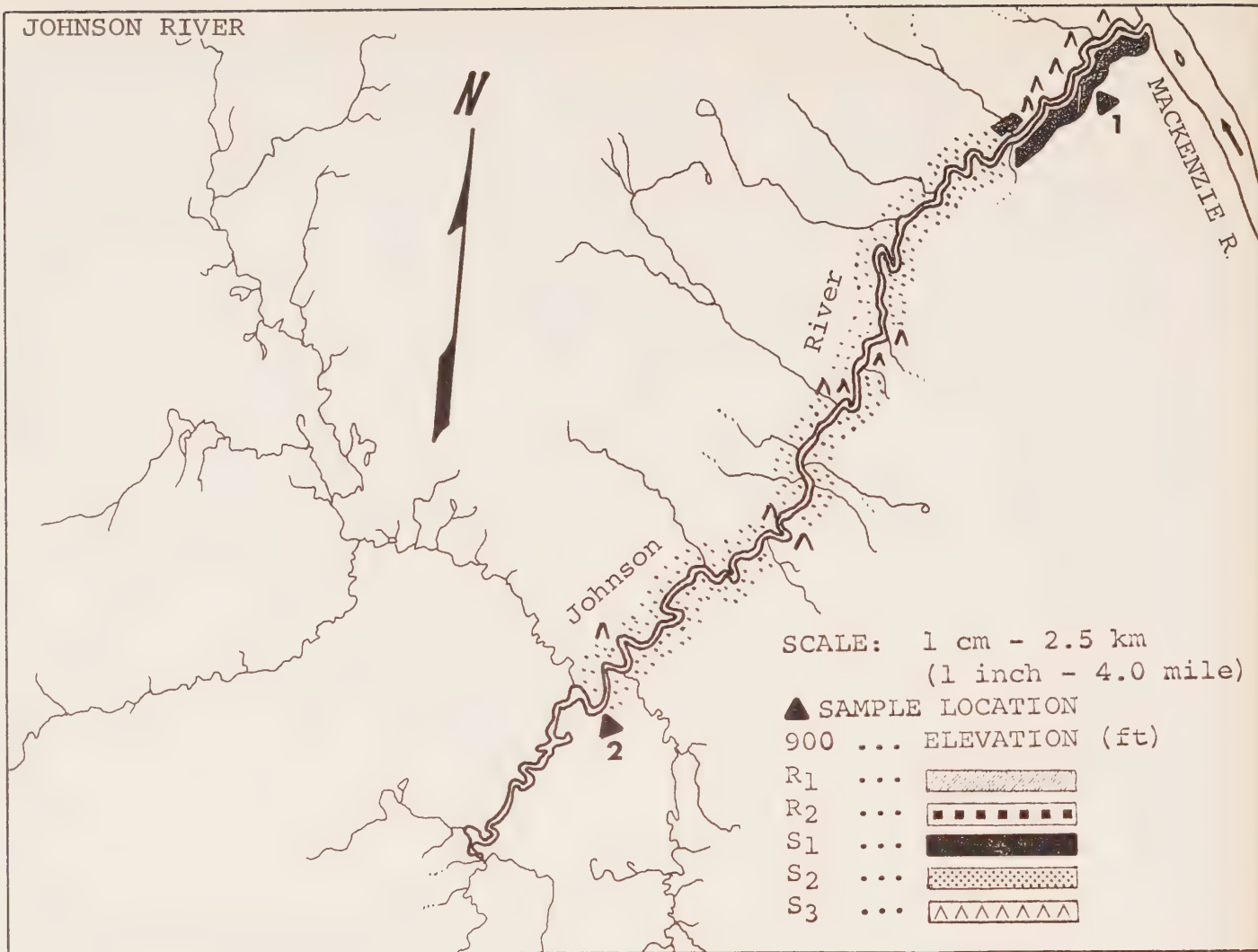
Date: 13-06-72

Temperature (C): Air-Water: 20;15

Dissolved Oxygen (D.O.): 9ppm

pH: 8.0

Alkalinity: Total (CaCO_3): 136.8ppmHardness : Total (CaCO_3): 188.1ppm



JOHNSON RIVER

Total length 55 miles; drainage area 1,415 sq miles.

Watercourse Type

This is a single channel, non-mountain river which flows across the relative low lying Mackenzie Plain. Even during the early summer the river is very shallow, with a number of places being only a few inches deep the whole width of the river. Near the mouth of the river, large rocks comprise almost one half of the river bed material. Generally the river bottom appeared to be gravel and sand with silt deposits becoming more common further upstream.

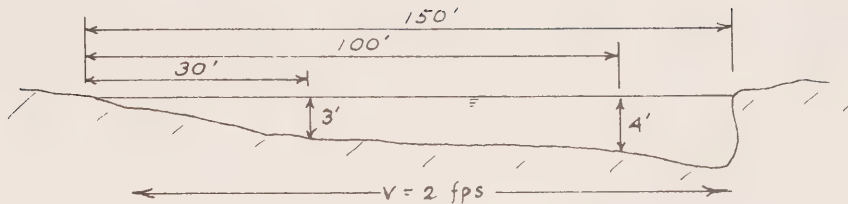
Riverbank Conditions

Because of some confusion occurring in the bank descriptions for this river the following information will be very general.

S₃ regions entered on the map are typically 40 to 50 foot clay banks on a 60° to 70° slope. Mud slides are very common along the reach between station 1 and station 2. At approximately the 9 to 10 mile mark a large (150 foot wide) mud flow has entered the river. River bank vegetation is very sparse. The river's flood plain is very wide.

JOHNSON RIVER Cont'dFlow Conditions

Date: 07-06-72
 Location: Station 1

Assessment of the Fish Resources

Catch data for the Johnson River is relatively low and an adequate assessment of the fishery potential is not possible. The area at Station 2 tends to serve as a longnose sucker nursery area and presumably there exists a spring spawning run of this species in the river. Information on other spring or fall spawning fish species is limited. The river is not domestically fished.

Sample Location Data: Johnson River

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-71 June 27	gravel	heavy silt	14 14	negative		
#1-71 July 29	gravel sand	green	21 20	seine	pike	1 immature
#1-71 Sept. 04	boulders gravel	dark rust	20 12	negative		
#1-72 June 07	boulders gravel	light silt	17 11	seine	lake chub humpback whitefish	1 mature 1 mature
#2-71 June 27	gravel	clear	13 14	negative		

Sample Location Data: Johnson River cont'd

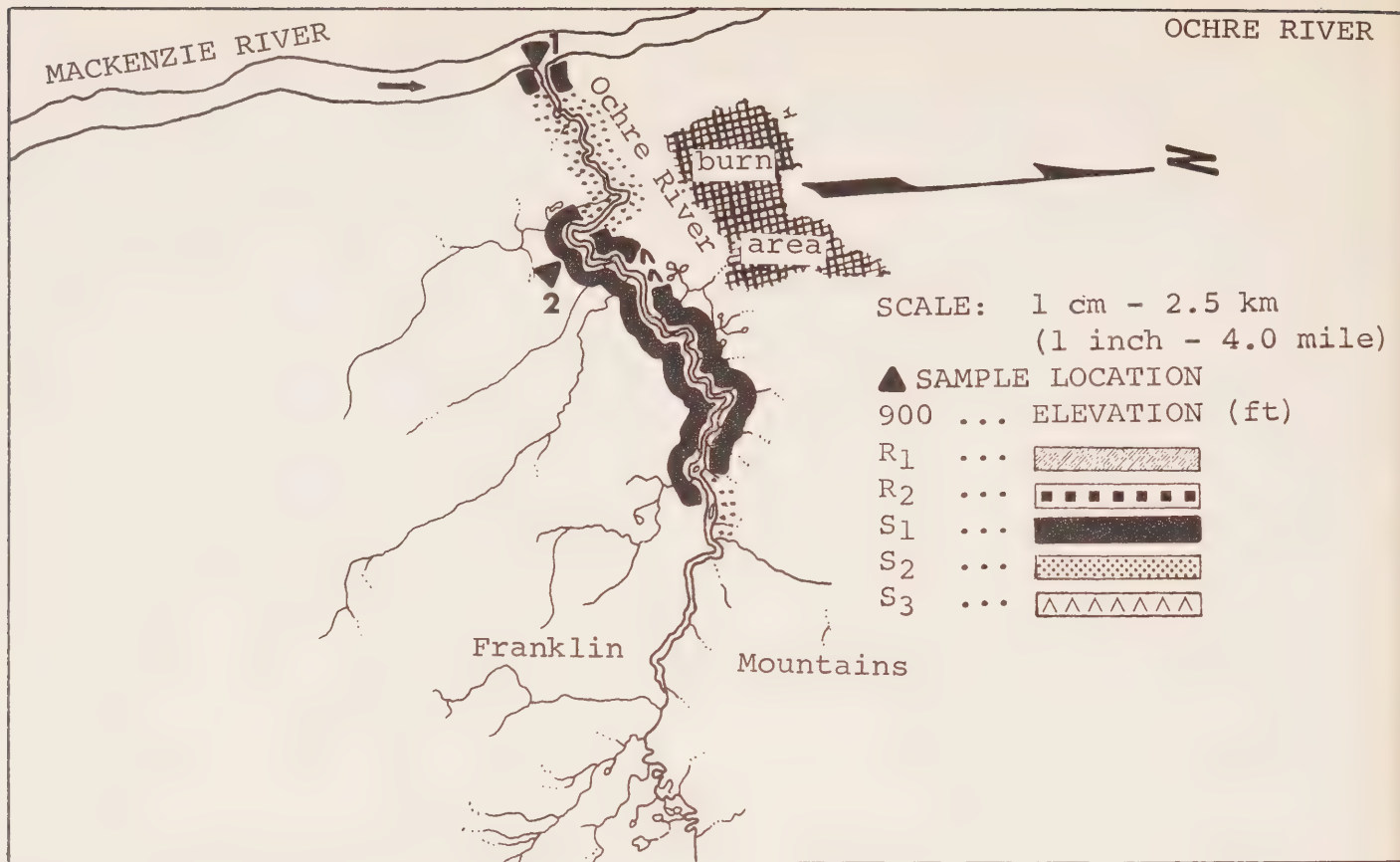
Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#2-71 July 29	gravel	light rust	21 20	seine	longnose sucker lake chub	1 8	immature immature
#2-71 Sept. 04	gravel	dark rust	15 10	seine	longnose sucker trout perch lake chub	22 1 1	immature immature immature
#2-72 June 07	gravel	heavy silt	17 8.5	seine	lake chub	15	immature

Sample Location Water Chemistry

Location 2

Date: 07-06-72

Temperature (C): Air-Water 17;8.5
 Dissolved Oxygen (D.O.): 10ppm
 pH: 8.5
 Alkalinity: Total (CaCO₃): 68.4ppm
 Hardness : Total (CaCO₃): 85.5ppm



OCHRE RIVER

Total length 48 miles; drainage area 711 sq miles.

Watercourse Type

The Ochre River is a single channel river with mountain drainage. During periods of low water the lower reaches of the river exhibit a multi-channel appearance. West of the mountains the river bed is comprised of very clean gravel and large boulders. East of the Franklin Mountains the river changes from its shallow channel flow to a deep, highly meandering flow. Because of the heavy bottom material there is probably little scouring during high water.

Riverbank Conditions

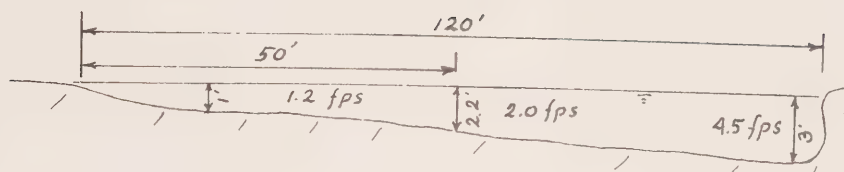
The lower 4 to 5 miles of river flow through a deep, narrow valley. The valley walls are 100+ feet high and steep. There is a fairly thick vegetation mat. This reach of river traverses a heavily burnt area and there are numerous mud slides into the river.

From the 5 mile mark to the 8 mile mark the river banks are low. The valley through this region is wide and of low approach slope.

From the 8 mile mark to the 14 mile mark the river passes through the rugged Franklin Mountains.

OCHRE RIVER Cont'dFlow Conditions

Date: 05-06-72
Location: Station 2

Assessment of the Fish Resources

The Ochre River appears to serve as a spawning and nursery area for the longnose sucker and lake chub. The presence of immature Arctic grayling suggest this to be a nursery area for the species (although an adult spawning run has not been detected). The movement of fall spawning fish species into the river may be limited by shallow water conditions and reduced flow at the mouth of the river in late September and October. The fall spawners may, however, utilize the mouth region which in the fall is delta-like with a fine gravel composition. The river is not fished domestically.

Sample Location Data: Ochre River

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-72 June 07	unknown	heavy silt		gill net	longnose sucker	3 ripe and mature
					flathead chub	2 mature
					inconnu	1 immature
#2-71 June 27	boulders	dark rust	15 16	negative		
#2-71 July 29	gravel	light rust	16 17		lake chub	65 mature
					longnose sucker	1 immature
#2-71 Sept. 06	gravel	dark rust	14 9	seine	longnose sucker	3 immature

Sample Location Data: Ochre River Cont'd

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#2-72 June 05	gravel sand silt	heavy silt	22 11	seine	grayling slimy sculpin longnose sucker lake chub	5 11 2 16	immature immature immature mature

Sample Location Water Chemistry

Location 1

Date: 05-06-72

Temperature (C): Air-Water: 22;11

Dissolved Oxygen (D.O.): 11ppm

pH: 8.0

Alkalinity: Total (CaCO₃): 68.4ppmHardness : Total (CaCO₃): 68.4ppm



WRIGLEY RIVER

Total length 39 miles; drainage area 835 sq miles.

Watercourse Type

This is a single channel, valley bottom river with an almost stabilized meander. The river bed contains large quantities of clean gravel. The river water is fairly clear throughout the year.

Riverbank Conditions

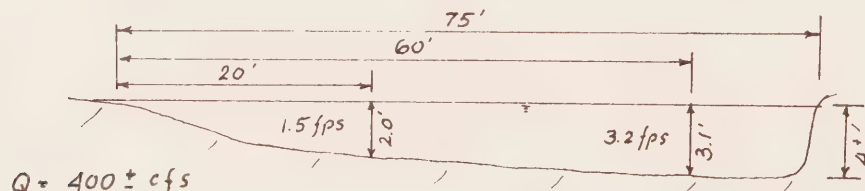
For most of the river length the actual river banks are low (2 to 4 feet above the water) and well vegetated. The surrounding terrain drains down to the river on a slope of 20° to 30°. There is, for the most part, no active flood plain as evidenced by the spruce growth right to the river's edge.

The exception to the stable conditions occur from the 2 mile mark to the 8 mile mark. Through this region mud slides, slumping and bank undercutting are very common. The mud slides and undercut generally occur on the outside of bends. The S₃ areas shown involve the failure of high (50 to 80 feet) almost vertical clay banks.

Flow Conditions

Date: 07-06-72

Location: Station 1

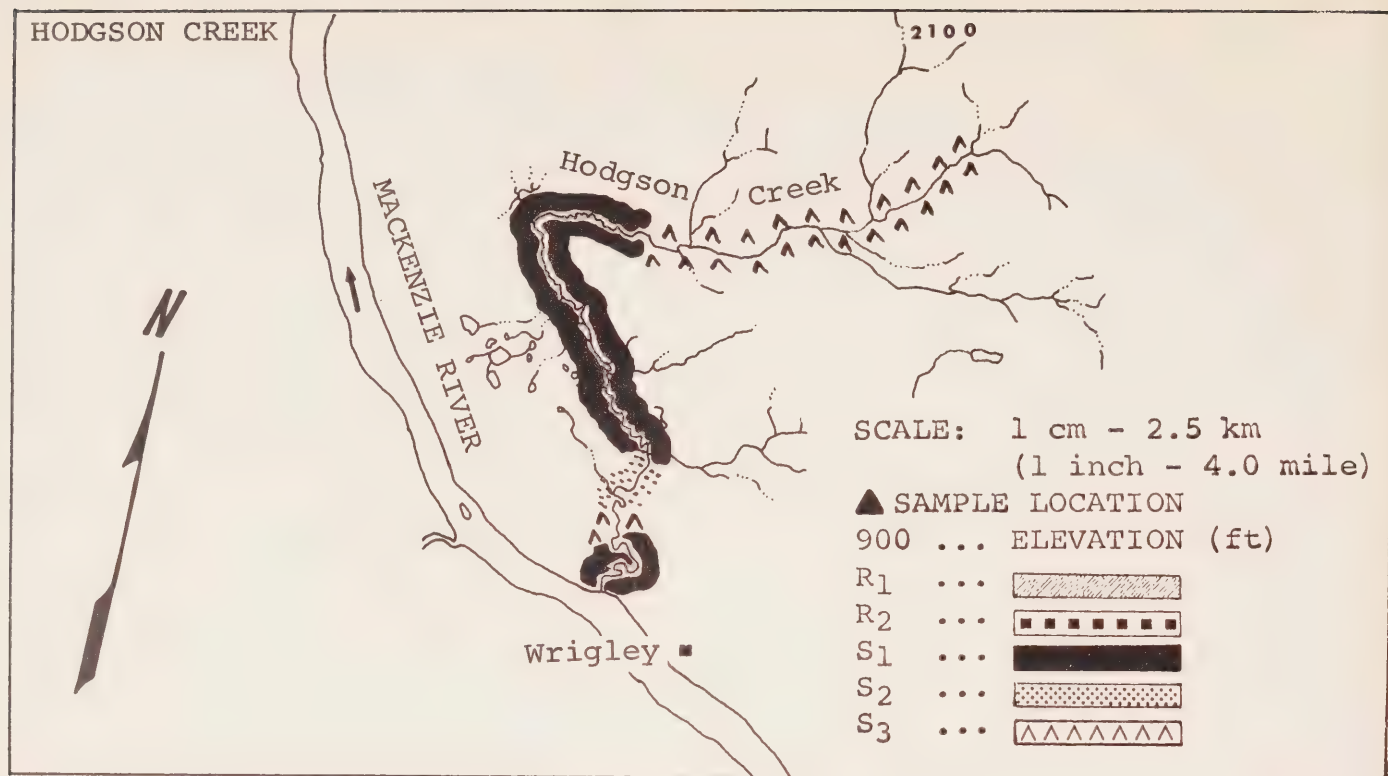


Assessment of the Fish Resources

Although lake chub are common within this river there is little evidence regarding other fish species. It is probable that Arctic grayling and longnose sucker utilize the river in the spring for spawning purposes. The river is not fished domestically.

Sample Location Data; Wrigley River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-72 June 07	gravel silt	light silt	17 12	gill net	grayling	1	ripe
					longnose sucker	1	ripe
#2-71 July 30	gravel sand silt	green	23 20	seine	lake chub	1	mature
#2-71 Sept. 03	gravel sand silt	light rust	14 10	seine	lake chub	4	mature
#2-72 June 05	gravel sand silt	light silt	15 12	seine	lake chub	28	mature
					slimy sculpin	3	mature



HODGSON CREEK

Total length 21 miles; drainage area approximately 106 sq miles.

Watercourse Type

This is a gravel bed stream draining the Franklin Mountains. It is a small river whose drainage area extends only to the mountain crest. There are large amounts of gravel in a 200 foot wide floodplain.

Riverbank Conditions

With the exception of the region between mile 2 and mile 6 the river banks are very low. The flood plain is wide and inactive. The surrounding terrain is also of very low profile.

The region from the 2 mile mark to the 6 mile mark is characterized by 40 foot exposed clay banks on a 60° to 70° slope. The potential for siltation of the river through this stretch is high.

The S₃ conditions shown near the headwaters are where Hodgson Creek flows through the rugged Franklin Mountains.

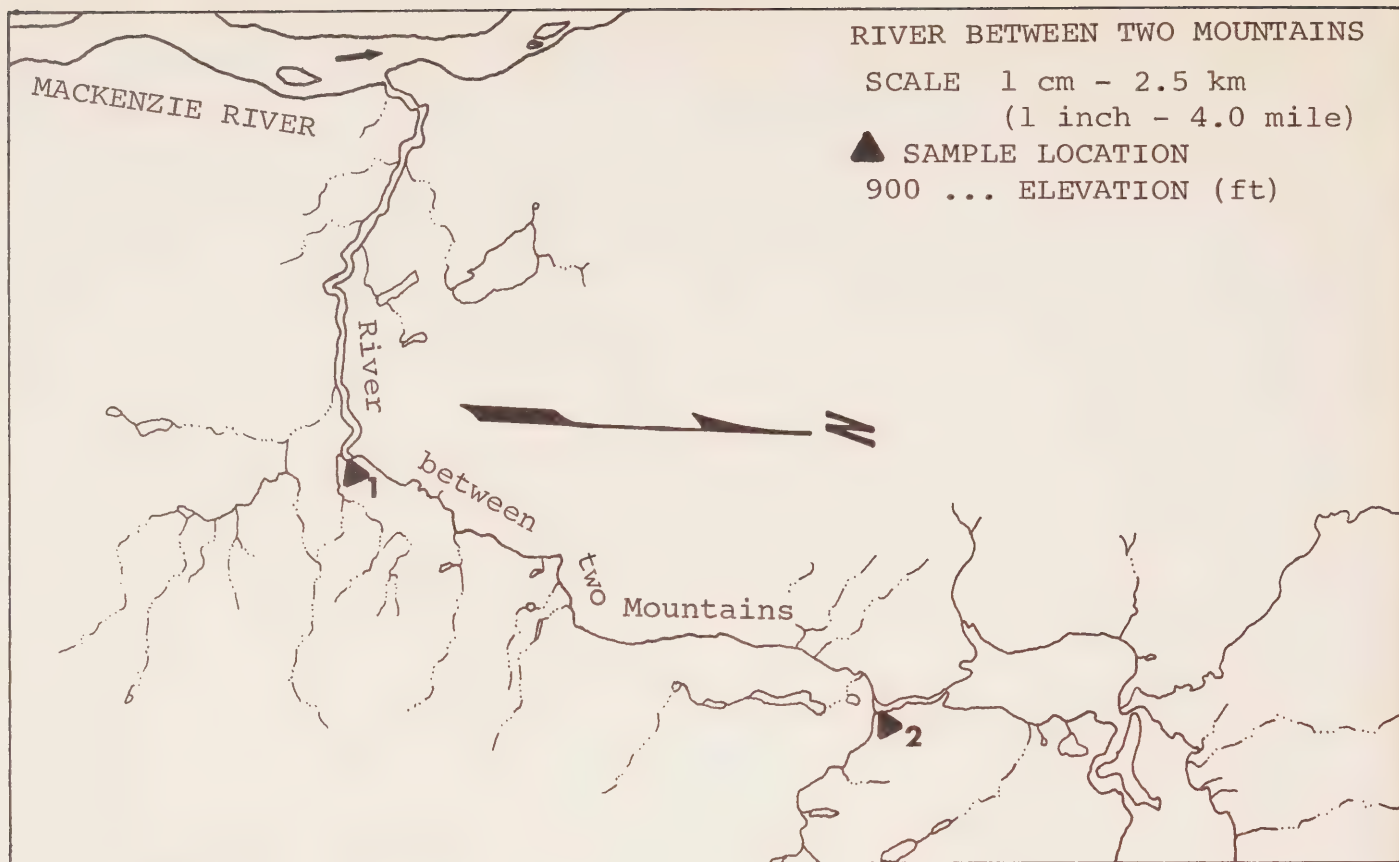
Flow Conditions

Not determined due to absence of sampling locations.

Estimated average width from the air - 40 feet.

HODGSON CREEK Cont'dAssessment of the Fish Resource

Hodgson Creek was not sampled during the 1971 or 1972 field surveys thus, the fishery potential remains unknown.



RIVER BETWEEN TWO MOUNTAINS

Total length 93 miles; drainage area 1,727 sq miles.

Watercourse Type

This is primarily a single channel, fast flowing river with numerous riffle areas and occasional pools. The river bottom consists of fine gravel with some locations showing boulders. No obstructions to flow were observed from Fish Lake to the Mackenzie River.

Riverbank Conditions

Not assessed.

Assessment of the Fish Resources

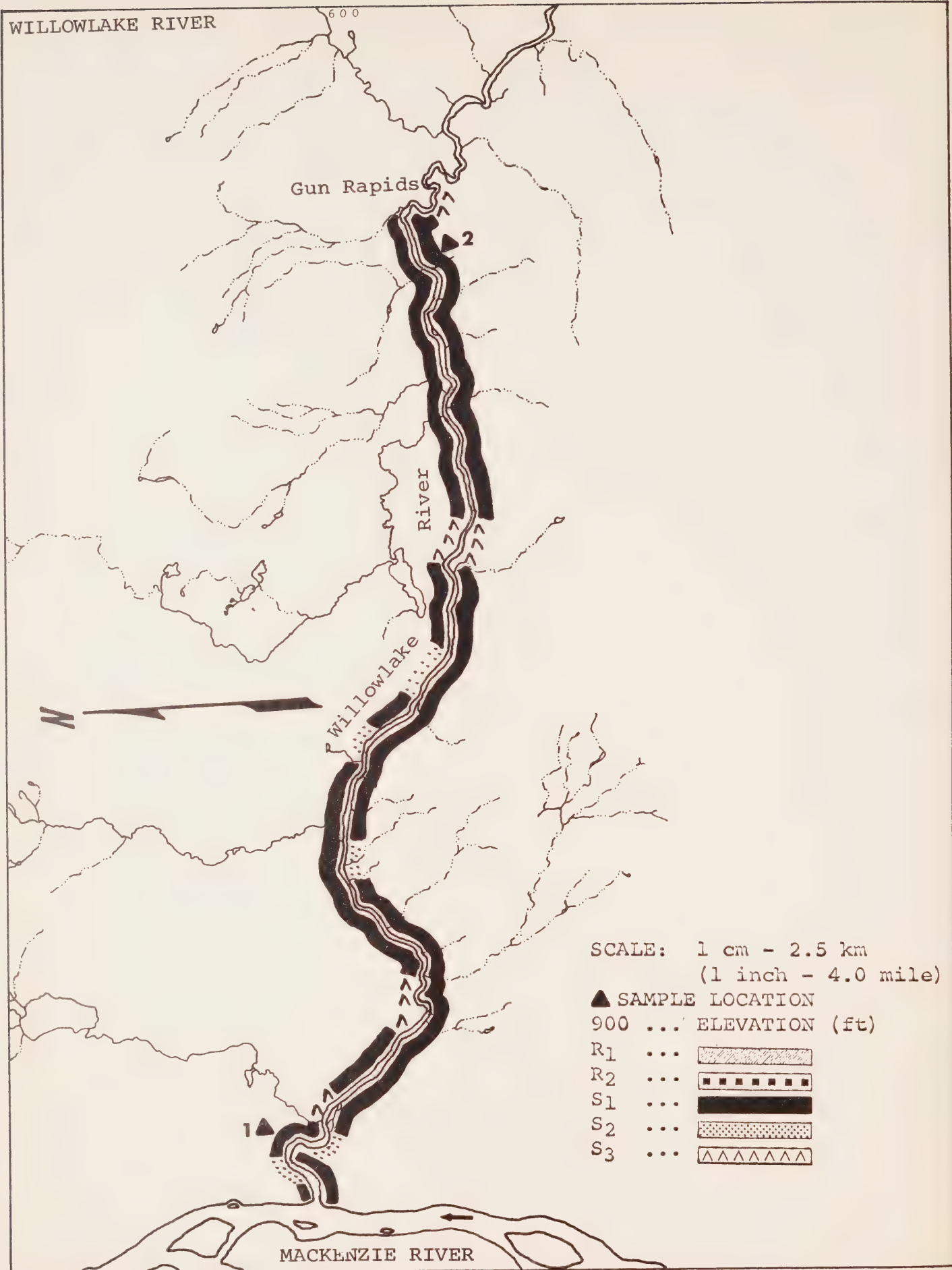
The river is a suspected spawning area and possible migration route for Arctic grayling between Fish Lake and the Mackenzie River. Fish Lake is fished domestically with the following species recorded: lake trout, yellow walleye, northern pike, Arctic grayling and whitefish spp.

A sport fishery for Arctic grayling exists near the river mouth.

Sample Location Data: River Between Two Mountains

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-71 June 26	gravel	dark rust	19 16	angling	grayling	1 mature
#1-71 July 28	gravel	light rust	31 21	negative		
#1-71 Sept. 02	boulders gravel	light rust	12 12	negative		
Station 1 not sampled in 1972 due to ice conditions and heavy run-off at the time of inspection. A new station (2) was established in an area approximately 3/4 mile downstream of Fish Lake.						
#2-72 May 06	boulders gravel	dark rust		seine	negative	
#2-72 May 15	boulders gravel	dark rust		seine	negative	
#2-72 June 06	boulders gravel	dark rust		angling	grayling	1 mature

WILLOWLAKE RIVER



WILLOWLAKE RIVER

Total length 194 miles; drainage area 7,899 sq miles.

Watercourse Type

This is a single channel, valley bottom river. Although there are several headwater lakes, they are not of large enough size to be a control factor for flood flows. The river shows little meander. Clean gravel is found the entire length of the river.

Riverbank Conditions

With the exception of several small areas, the Willowlake River has a wide flood plain (one-half mile width at approximately the 12 mile mark) which shows little evidence of any recent flooding. The river banks are generally low (5+ feet) and form the toe of a gently sloping well treed valley slope.

The two S₂ regions near the river mouth are 30 feet high on a 50° to 60° slope and display some minor flow slides into the river.

The S₂ regions shown further upstream have high (60 to 80 feet) valley walls, abutting onto the river edge, with a 60° slope. These areas are classified S₂ rather than S₃ because of their very stable appearance.

The S₃ areas shown at the 3 mile and 9 mile marks are typically 60 feet high on a 60° slope, with much exposed clay and shale. Failures observed included slides and gullying.

Flow Conditions

Date: 7-06-72
Location: Station 1

The river at time of visit was too wide and too deep to attempt to cross section.

Estimated width: 250 feet
Estimated current: 1 - 2 fps

Upstream areas of river were very slow moving.

Assessment of the Fish Resources

This river has excellent spawning potential. Natives fish the river mouth throughout the summer months and they report good spring catches of walleye, pike, sucker and burbot. There are no reports concerning runs of fall spawners.

Sample Location Data: Willowlake River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 June 26	silt sand	heavy silt	19 16	seine gill net	negative grayling pike longnose sucker	1 2 1	mature mature mature
#1-71 July 27	gravel	light rust	26 21	gill net observed	negative pike	- 1	-- immature
#1-71 Sept. 02	boulders silt	light rust	13 12	gill net	longnose sucker pike	1 1	mature mature
#1-72 June 07	silt sand	light silt	15 13	gill net	negative	-	--
#2-71 June 26	gravel	clear	19 16	negative	--	-	--
#2-71 July 27	boulders gravel	clear	25 21	negative	--	-	--
#2-71 Sept. 02	gravel silt sand	light rust	14 13	seine	grayling	1	immature
#2-72 May 13	gravel	dark rust	10 2	seine	pike lake chub	1 2	immature mature
#2-72 June 06	gravel sand	dark rust	15 13	seine	lake chub slimy sculpin longnose sucker	237 1 1	mature mature immature
#2-72 June 06	gravel sand	dark rust	15 13	angling	negative	-	--

Sample Location Data: Willowlake River Cont'dSample Location Water Chemistry

Location 2

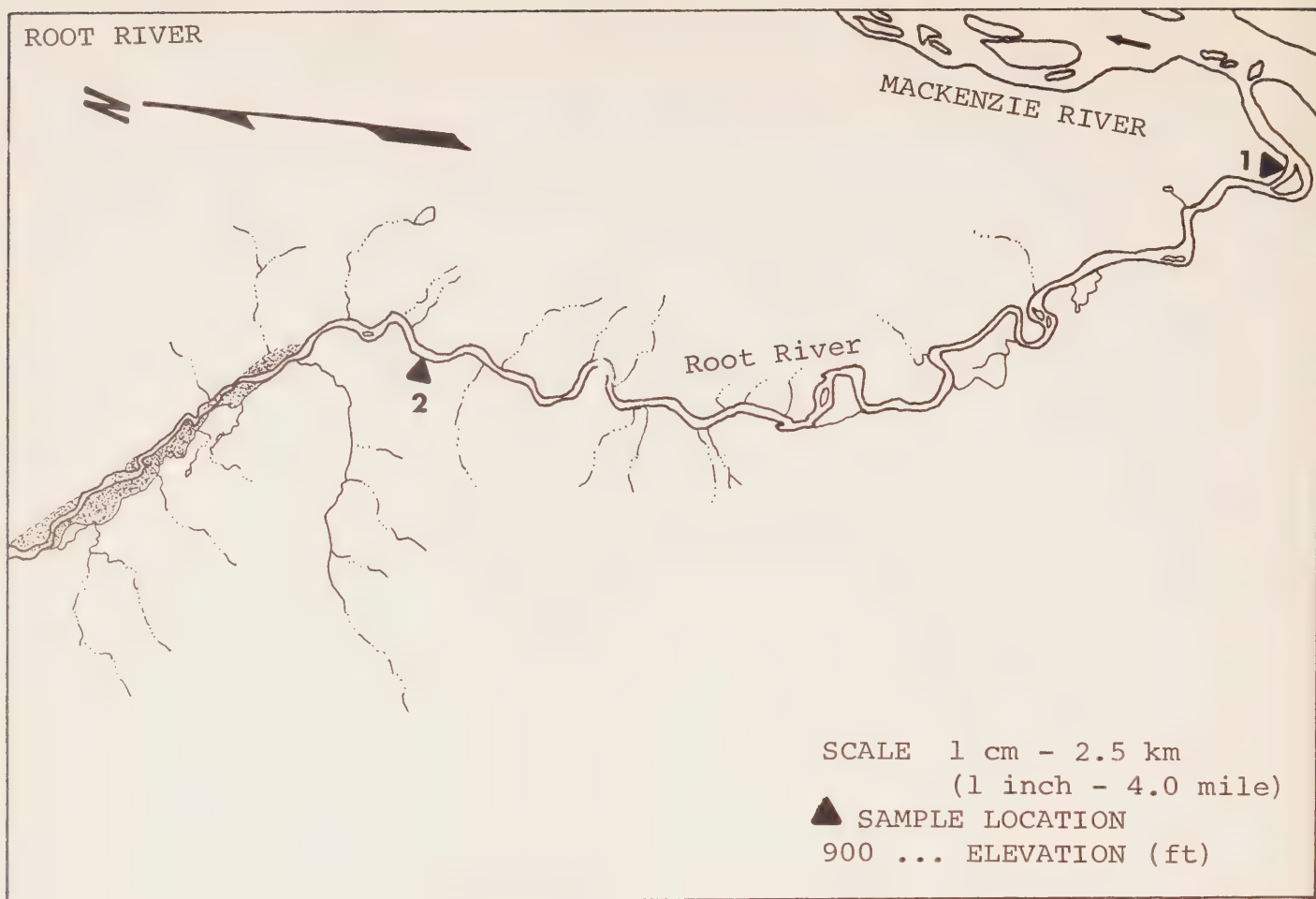
Date: 06-06-72

Temperature (C): Air-Water: 15;13

Dissolved Oxygen (D.O.): 10ppm

pH: 8.0

Alkalinity: Total (CaCO_3): 85.5ppmHardness : Total (CaCO_3): 102.6ppm



ROOT RIVER

Total length 148 miles; drainage area 5,549 sq miles.

Watercourse Type

This is a sand bed, semi-mountain river. There are no flood control features. The river consists of a deep channel with gravel banks for the first 4 miles upstream from its mouth. A large island and a sharp bend then tend to divide the river into smaller shallow channels which are characteristic of the river for the remainder of its course upstream. In the region near the 50 mile mark the flood plain is very silty and approximately a mile wide. The river channel shows evidence of extensive shifting.

Riverbank Conditions

Riverbank stability was not assessed due to survey priorities not allowing time for flying this river.

Flow Conditions

Not assessed.

Assessment of the Fish Resources

The Root River serves as a spawning and nursery area for longnose sucker and lake chub. Gill net catches at the 4 mile mark (station 1) in May and June indicate a

Assessment of Fish Resources Cont'd

movement of inconnu into the river quite possibly for feeding purposes.

Large numbers of lake chub tend to congregate in shallows during May for spawning, particularly in the vicinity of station 1. The river in June increases its silt load and water levels rise quickly due to increased run-off from the land.

The river is not fished domestically.

Sample Location Data: Root River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Color	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 June 25	silt sand	green	17 13	angling gill net	negative inconnu	8	immature and mature
					pike	3	mature
					flathead chub	7	mature
#1-71 July 25	gravel	green	32 22	negative			
#1-71 Sept. 25	gravel	green	10 11	gill net seine	negative longnose sucker lake chub	3 6	immature immature
#1-72 May 13	gravel	light rust	10 6	seine	lake chub	234	mature
#1-72 May 26	gravel	heavy silt	22 8	gill net seine	humpback whitefish lake chub humpback whitefish trout perch	1 209 1 1	mature mature mature mature
#2-71 June 25	gravel		16 11	angling seine	negative slimy sculpin lake chub	1 15	immature immature

Sample Location Data: Root River Cont'd

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#2-71 July 28	gravel	green	32 20	seine	negative	
#2-71 Sept. 02	gravel silt sand	green	12 11	seine	lake chub	5 immature
#2-72 May 26	gravel silt	heavy silt	17 5	seine	longnose sucker lake chub	1 immature 8 mature

Sample Location Water Chemistry

Location 2

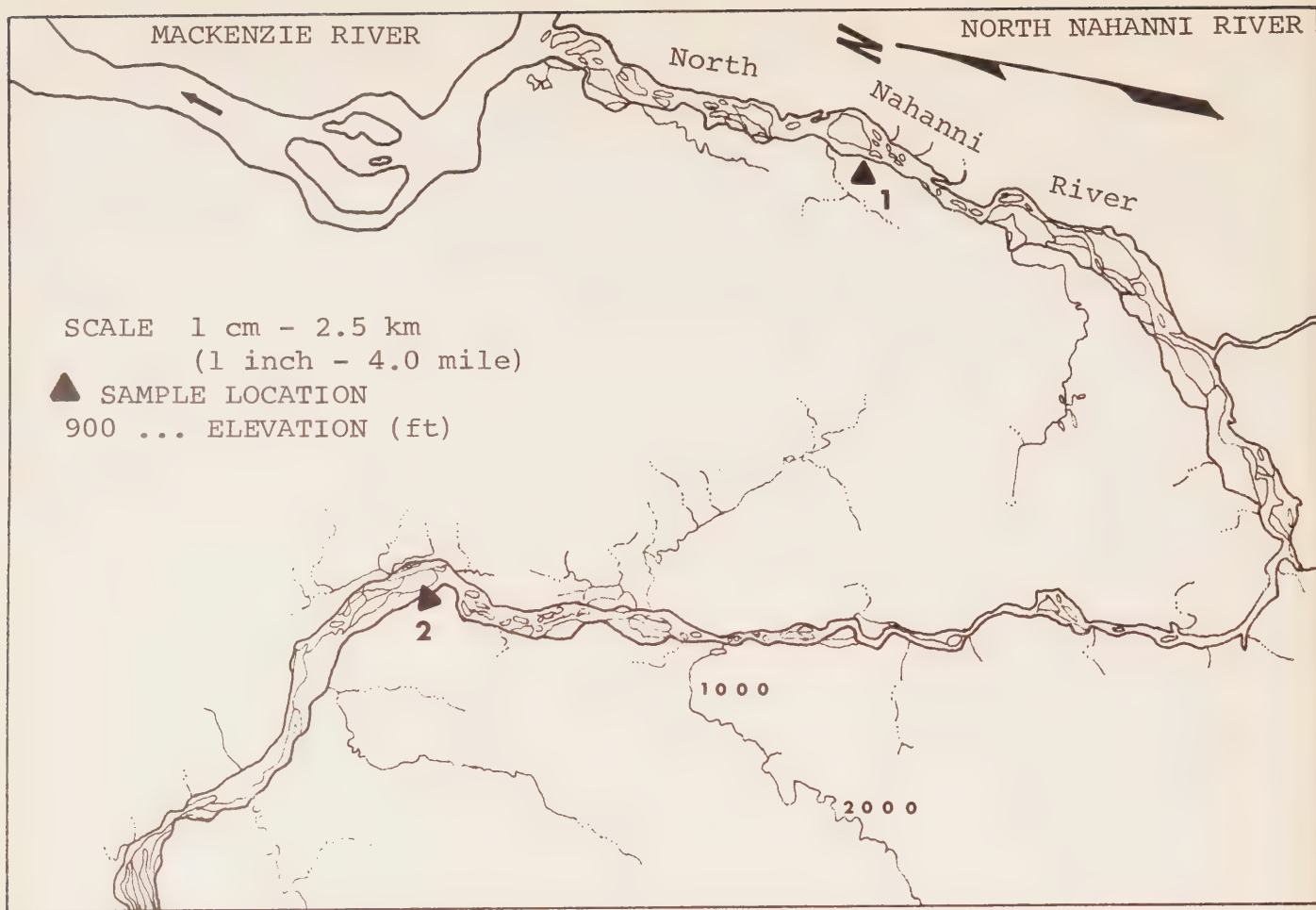
Date: 26-05-72

Temperature (C): Air-Water: 17;5

Dissolved Oxygen (D.O.): 12ppm

pH: 8.0

Alkalinity: Total (CaCO₃): 102.6ppmHardness : Total (CaCO₃): 119.7ppm



NORTH NAHANNI RIVER

Total length 70 miles; drainage area 5,363 sq miles.

Watercourse Type

This is a sand bed river with its headwaters located in the mountains. There are no flood control features. The river is wide (300+ feet) and multi-channelled. The river flow is swift (4 - 5 fps) and shallow. Extensive gravel areas were noted throughout the length surveyed.

Riverbank Conditions

Not assessed due to survey priorities not allowing time for flying this river.

Topographic maps show a wide flood plain extending into a gentle valley slope for most of the lower reaches of this river.

Flow Conditions

Not assessed.

Assessment of the Fish Resources

Although adult fish runs have not been detected in this river to date, the river shows evidence of being a nursery area for a number of fish species. The major

Assessment of the Fish Resources Cont'd

species encountered include longnose sucker, Arctic grayling, chub spp. and round whitefish. These species utilize the North Nahanni River for nursery purposes and possible spawning. Since the river was not sampled during September and October of 1972 possible movements of fall spawners were not detected.

It is likely, however, that the North Nahanni exhibits fall conditions similar to those of other mountain-type rivers. (see Keele, Mountain and Redstone Rivers) This river is not fished domestically.

Sample Location Data: North Nahanni River

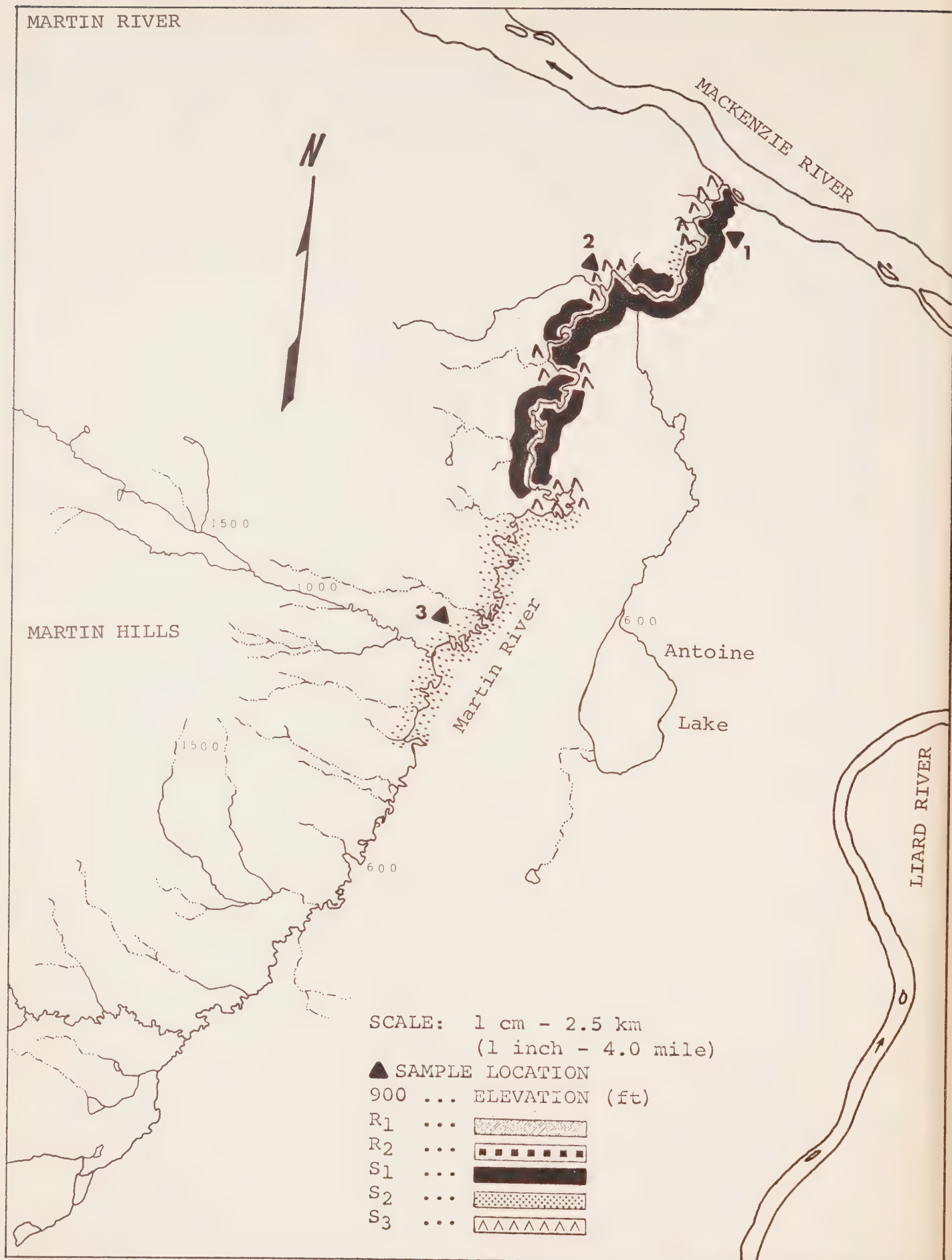
Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71			20	negative	--	-	--
June 23	gravel	--	14				
#1-71			32				
July 28	gravel	heavy silt	20	negative			
#1-71			22				
Aug. 30	gravel	green	13	seine	longnose sucker	4	immature
	silt				flathead chub	1	immature
	sand				lake chub	9	immature
					slimy sculpin	2	immature
#1-72			6				
May 15	gravel	light silt	3	seine	lake chub	11	mature
	silt				longnose sucker	2	immature
					grayling	3	immature
					round whitefish	2	immature
#1-72			14				
May 26	gravel	heavy silt	4	seine	grayling	2	immature
	silt				longnose sucker	10	immature
					lake chub	7	mature
					flathead chub	1	immature
#2-71			13				
June 25	gravel	green	8	seine	negative		
				angling	negative		
#2-71			27				
July 28	gravel	clear	16	negative			

Sample Location Data: North Nahanni River Cont'd

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#2-71 Aug. 30	gravel silt	green	22 12	seine	longnose dace	1	immature
#2-72 May 26	gravel	heavy silt	20 6	seine	slimy sculpin grayling round whitefish	1 1 1	immature immature immature

Sample Location Water Chemistry

Location 1	Dates: 23-06-71	26-05-72
Turbidity:	160 J.T.U.	
Lead: Dissolved (Pb)	.005ppm	
Hardness: Total (CaCO ₃)	148mg/l	136.8ppm
Alkalinity: Total (CaCO ₃)	111mg/l	102.6ppm
Specific Conductance: (umho/cm)	308	
Temperature (C): Air-Water:	20;14	14;4
Copper: Dissolved (Cu)	.003ppm	
Zinc: Dissolved (Zn)	.003ppm	
Dissolved Oxygen (D.O.)		10ppm
pH:		8.5



MARTIN RIVER

Total length 75 miles; drainage area 1,127 sq miles.

Watercourse Type

This is a sand bed, single channel river. The upper reaches of the river (approximately 16 mile mark to headwaters) have a tortuous meander pattern with many oxbows and cut-offs. The lower reaches have a more controlled meander.

Bog and marsh comprise the surrounding terrain in the upper reaches.

Riverbank Conditions

The lower 4 to 5 miles of this river have S₃ conditions on the outside bends. A typical river bank in this area is composed of clay and sand, is 40 feet high with a 40° to 60° slope. Varying degrees of slumping are evident.

The reach from 5 miles to approximately 16 miles has low, stable banks, interspersed with several steep exposed slide areas on cut-off banks.

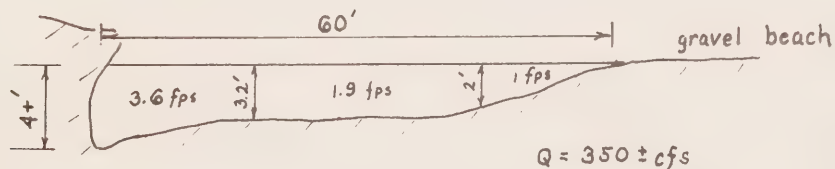
The river banks from the 16 mile mark on upstream are low (2 feet to 5 feet) and heavily undercut with many tree falls into the river.

Area just upstream of Station 2 is an old burn area. The large amount of overland erosion reaching the river is shown by a very heavy silt load in the river. There are also some large gravel deposits in this region.

Flow Condition

Date: 02-06-72

Location: Station 2

Assessment of the Fish Resources

The Martin River is a nursery area for Arctic grayling, northern pike, yellow walleye, burbot, several whitefish spp. and longnose sucker. It is also a suspected spawning area for all these species except the whitefish. The river is an overwintering area for northern pike. Domestic fishing is conducted at the river mouth in the spring and fall. A more intensive survey of the river is being conducted during the winter of 1972-73.

Sample Location Data: Martin River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 June 21	unclassified	dark rust	26 23	angling seine	pike char sp. broad whitefish trout perch white sucker goldeye spottail shiner	1 1 24 34 18 1 3	immature immature immature immature immature immature immature
#1-72 June 02	boulders gravel	heavy silt	17 11	seine	slimy sculpin	1	mature
#2-71 June 21	silt sand	dark rust	22 21	seine	negative		
#2-71 July 23	boulders gravel	clear	19 17	seine	grayling trout perch	1 1	immature immature
#2-71 Aug. 31	boulders gravel	light rust	27 15	seine	slimy sculpin	2	immature
#3-72 May 04	gravel	light rust	6 4	observed	sculpin sp.	1	mature
#3-72 June 02	gravel	heavy silt	17 11	seine	grayling slimy sculpin white sucker	1 3 39	immature mature young of year

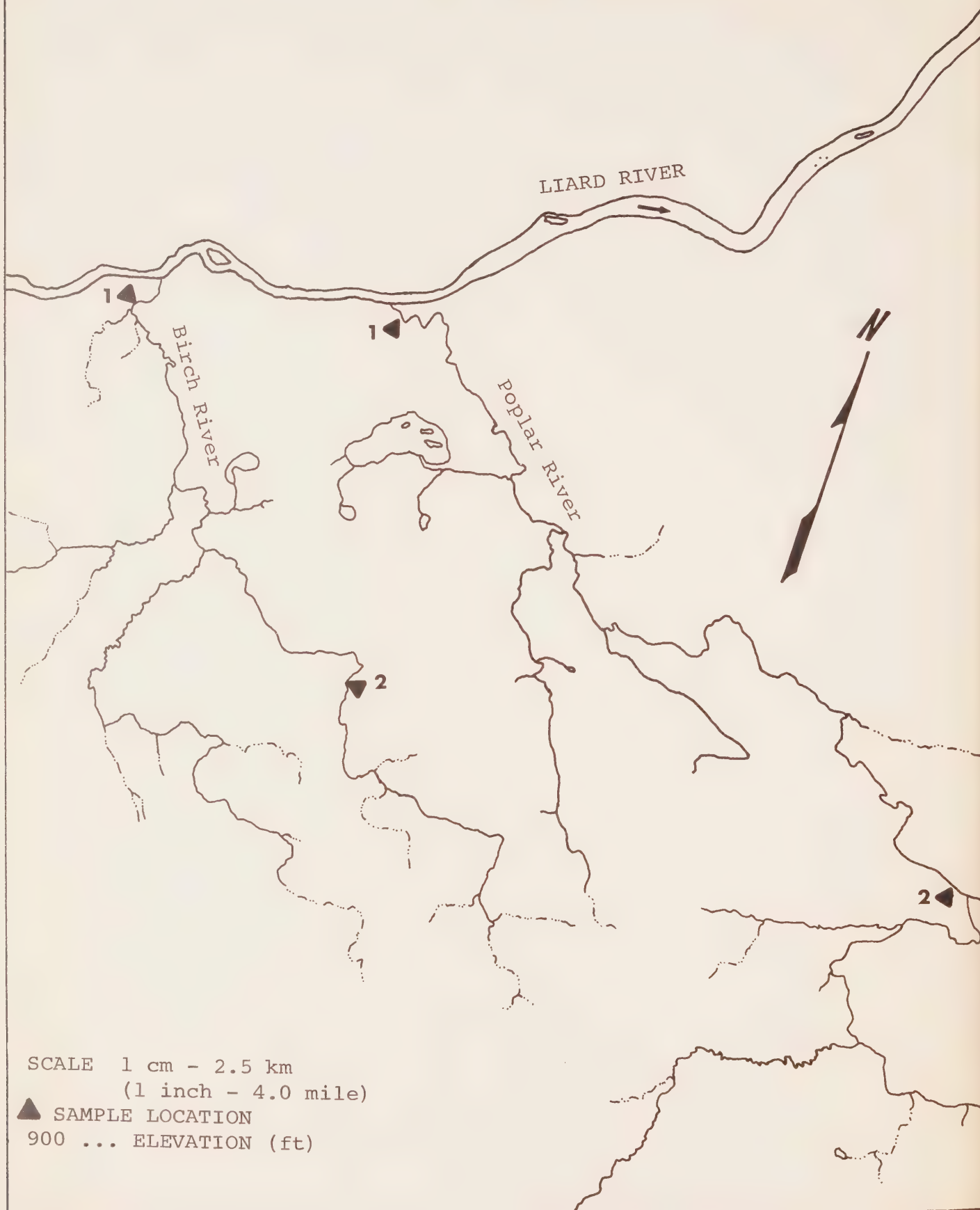
Sample Location Water Chemistry

Location 3

Date: 02-06-72

Temperature (C): Air-Water: 17;11
 Dissolved Oxygen (D.O.): 10ppm
 pH: 8.0
 Alkalinity: Total (CaCO₃): 68.4ppm
 Hardness : Total (CaCO₃): 85.5ppm

POPLAR RIVER and BIRCH RIVER



POPLAR RIVER

Total length 62 miles; drainage area 439 sq miles.

Watercourse Type

Single channeled throughout its length, the river is generally shallow with many areas of fine gravel. Boulders and coarse gravel are also common along its course. The headwater draining Cormack Lake is highly meandering through a muskeg terrain and beaver activity was noted.

Riverbank Conditions

Not assessed. (see Sec. 5)

Assessment of the Fish Resources

Little information is available on this river due to timing and sampling difficulties preceding and following spring breakup. The river possibly serves as a nursery area for longnose sucker, Arctic grayling, northern pike and burbot, but adult fish runs have not been determined. The river is not domestically fished but Cormack Lake is fished periodically.

Sample Location Data: Poplar River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 June 23	gravel	light rust	23 30	angling	pike	1	mature
#1-71 July 24	boulders	clear	26 30	observed	burbot	1	mature
#1-71 Aug. 26	boulders	Low water not sampled.					
Location 1 not sampled in 1972 due to heavy spring run-off.							
#2-71 June 23	gravel	dark rust	23 21	angling	pike	2	mature
#2-71 July 24	boulders	dark rust	24 17	seine	longnose sucker	3	immature
	gravel				longnose dace	2	immature
					grayling	3	immature
					trout perch	1	immature

Sample Location Data: Poplar River cont'd

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#2-71 Aug. 26	boulders gravel	light silt	18 14	negative	--	-	--
#2-72 May 04	gravel	light silt	--	seine	negative		
#2-72 May 24	gravel	dark rust	8 6	seine	negative		

Sample Location Water Chemistry: Poplar River

Location 1 Date: 24-07-71

Temperature (C): Air-Water 26;20
 Dissolved Oxygen (D.O.): 10ppm
 pH: 8.0
 Alkalinity: Total (CaCO₃): 171ppm
 Hardness : Total (CaCO₃): 136.8ppm

Location 2 Dates: 24-07-71

24-05-72

Temperature (C): Air-Water; 24;17 7.5;6
 Dissolved Oxygen (D.O.): 9ppm 11ppm
 Alkalinity: Total (CaCO₃): 119.7ppm 85.5ppm
 Hardness : Total (CaCO₃): 119.7ppm 85.5ppm
 pH: 8.0 8.5

Sample Location Data: Cormack Lake (mile 62)

71			19				
Aug. 25	boulders	light rust	14	gill net	pike	4	mature
	gravel				longnose sucker	4	mature
					white sucker	1	mature

Cormack Lake was not sampled during 1972.

BIRCH RIVER

Total length 37 miles; drainage area 151 sq miles.

Watercourse Type

This is a meandering stream characterized by high steep cliffs along its course. A 10 foot falls located approximately at the 7 mile mark limits the possibility of fish migrations upstream.

Riverbank Conditions

Not assessed. (see Sec. 5)

Assessment of the Fish Resources

The downstream reaches below the falls are important to the fish resource, serving as a nursery area for Arctic grayling and longnose sucker. Other species present are primarily smaller forage fish. Adult fish runs have not been detected and the river is not fished domestically.

Sample Location Data: Birch River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 June 23	boulders	dark rust	26 21	seine	trout perch lake chub	1 18	immature immature
#1-71 July 24	boulders gravel	clear	25 20	seine	grayling longnose sucker slimy sculpin longnose dace	7 2 8 6	immature immature immature immature
#1-71 Aug. 26	boulders gravel	dark rust	18 16	seine	longnose sucker trout perch slimy sculpin longnose dace	2 4 2 5	immature immature immature immature
#1-72 May 23	boulders gravel	light silt		gill net	longnose sucker	1	immature
#2-71 June 23	sand silt	dark rust	25 21	seine	lake chub brook stickleba k	14 9	immature immature

Sample Location Data: Birch River Cont'd

Station 2 was discontinued in 1971 due to low water levels.

Sample Location Water Chemistry: Birch River

Location 1

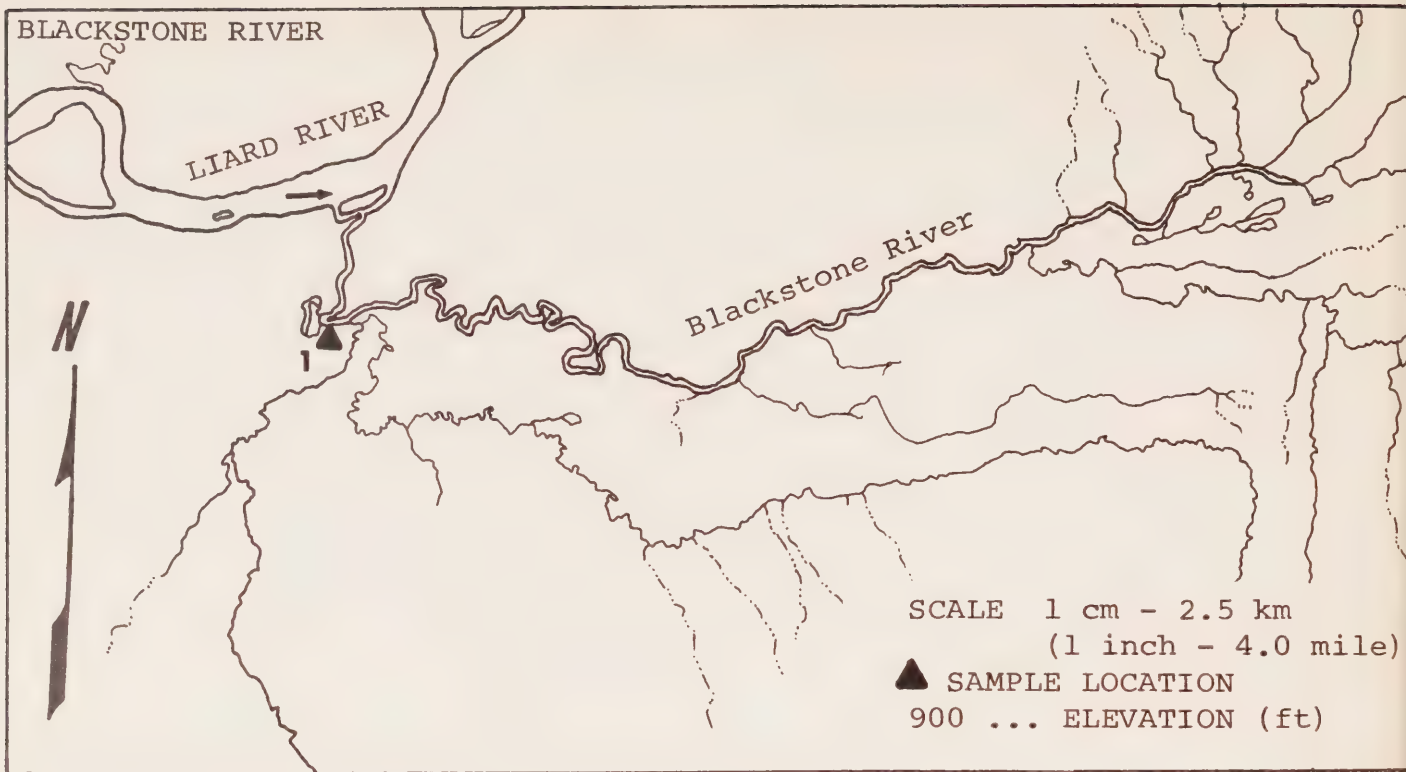
Date: 24-07-71

Temperature (C): Air-Water: 25;20

Dissolved Oxygen (D.O.): 9ppm

Alkalinity: Total (CaCO₃): 171.0ppm

Hardness : Total (CaCO₃): 136.8ppm



BLACKSTONE RIVER

Total length 60 miles; drainage area 512 sq miles.

Watercourse Type

A single channeled river for much of its course, the Blackstone River is shallow with many areas of gravel. The lower 3 miles are generally deeper than the 'shallow' upstream segments.

Riverbank Conditions

Not assessed. (see Sec. 5)

Assessment of the Fish Resources

The Blackstone River serves as a nursery and spawning area for long-nose sucker. It is also a suspected spawning area for yellow walleye and northern pike.

The river is not domestically fished (probably due to its distance from any settlements.)

Sample Location Data: Blackstone River

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-71 June 21	gravel silt sand		30 24	angling seine gill net	negative negative pike walleye	3 mature 8 mature
#1-71 July 26	gravel silt sand	heavy silt	29 25	seine	longnose sucker trout perch spottail shiner emerald shiner	84 immature 6 immature 5 immature 6 immature
#1-71 Aug. 26	silt gravel	clear	16 16	seine angling	negative pike	1 mature
#1-72 May 10	gravel silt	heavy silt flood stage		angling	negative	
#1-72 May 16	gravel silt	heavy silt flood stage		angling	negative	
#1-72 May 24	gravel silt	heavy silt		gill net	humpback whitefish	2 immature

Sample Location Water Chemistry

Location 1 Date: 22-06-71

Turbidity: 0.7 J.T.U.

Lead: Dissolved (Pb) 0.011ppm

Hardness: Total (CaCO₃): 160mg/l

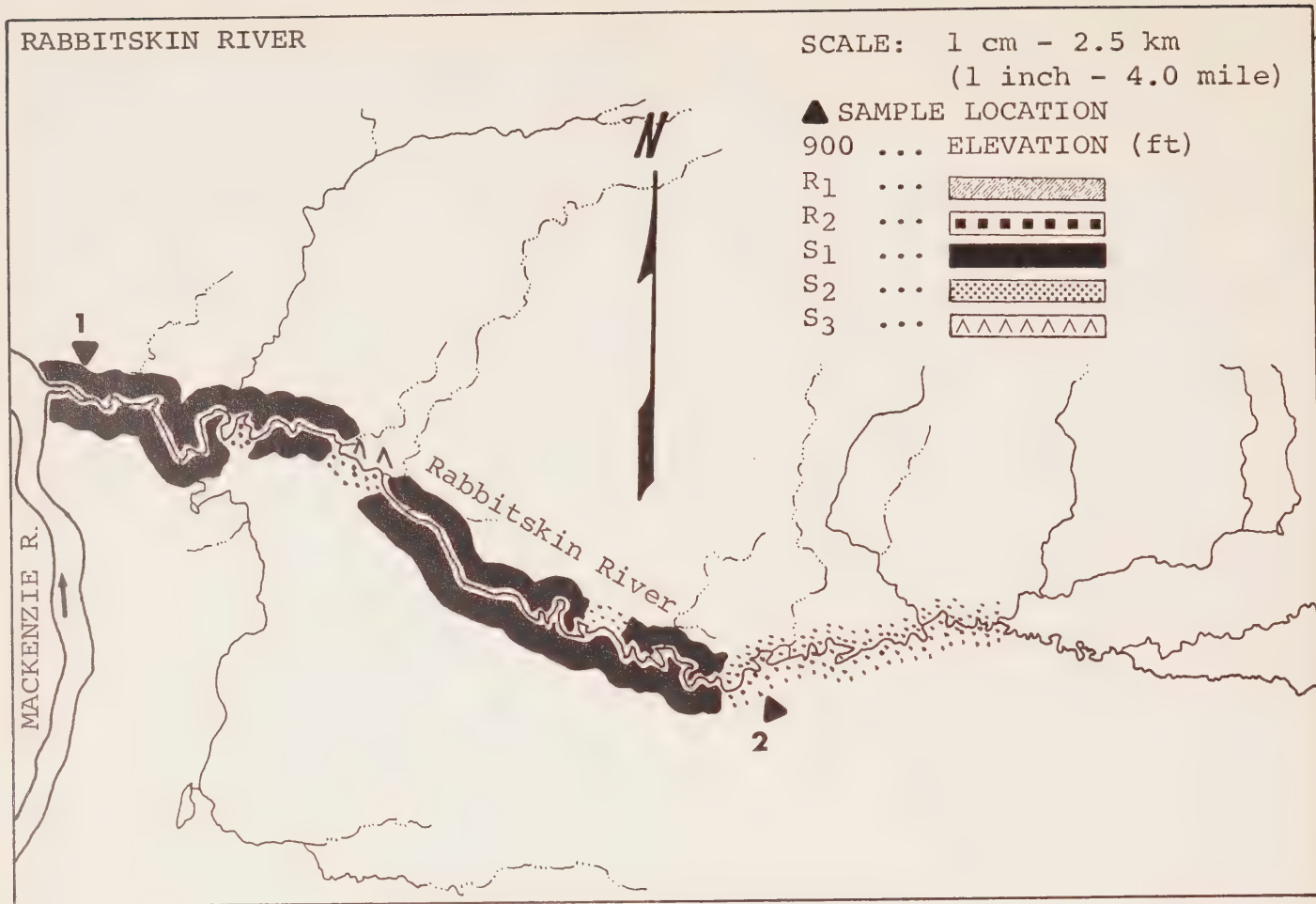
Alkalinity: Total (CaCO₃): 146mg/l

Specific Conductance: (umho/cm) 322

Temperature (C): Air-Water: 20;22

Copper: Dissolved (Cu): .001ppm

Zinc: Dissolved (Zn) .001ppm



RABBITSKIN RIVER

Total length 66 miles; drainage area 1,427 sq miles.

Watercourse Type

This is a sand bed, non-mountain river which exhibits no flood control features. It is a shallow stream with medium meander in the middle and lower reaches and high meander in the upper reaches. The surrounding terrain is of low profile. The upper reaches (upstream of Station 2) are muskeg and swamp. The lower 20 miles of river bottom are gravel and cobble with some large boulders.

Riverbank Conditions

The lower 4 miles of river bank are 5 feet to 10 feet above normal water level and progressing back from the river on a flat slope. From the 4 mile mark to the headwaters the river banks are generally level with the water surface. The tree line extends right to the river edge. Set back from the actual river bank is a rise of approximately 30 feet. The complete river length is densely treed with aspen and spruce.

The S₃ region shown at approximately the 10 mile mark is a 30 foot high cut bank on a 40° to 50° slope. Instability is shown by minor slumping.

At the 22+ mile mark the surrounding terrain becomes very swampy. Beaver dams, fallen trees and debris are common in these upper reaches.

RABBITSKIN RIVER Cont'dFlow Conditions

Date : 01-06-72
 Location : Station 2
 Width : 40 feet
 Depth varied between 1 and 3 feet
 Velocity between: 1 - 2 fps

Assessment of the Fish Resources

Nineteen species of fish are found in the Rabbitskin River and estuary. The major species are northern pike, longnose sucker, Arctic grayling and several members of the cyprinid family. The river is utilized for spawning by northern pike, longnose sucker, white sucker, Arctic grayling, mountain whitefish and yellow walleye. It is suspected that burbot, trout-perch, slimy and spoonhead sculpin, Arctic lamprey and several cyprinid species spawn in the Rabbitskin River.

The Rabbitskin River is an important nursery area for northern pike, Arctic grayling, trout-perch and longnose dace. The estuary is important as a nursery area for northern pike, humpback whitefish, Arctic grayling and yellow walleye. Whether or not these fish are resident in the Rabbitskin, the Mackenzie River or both, has not been determined.

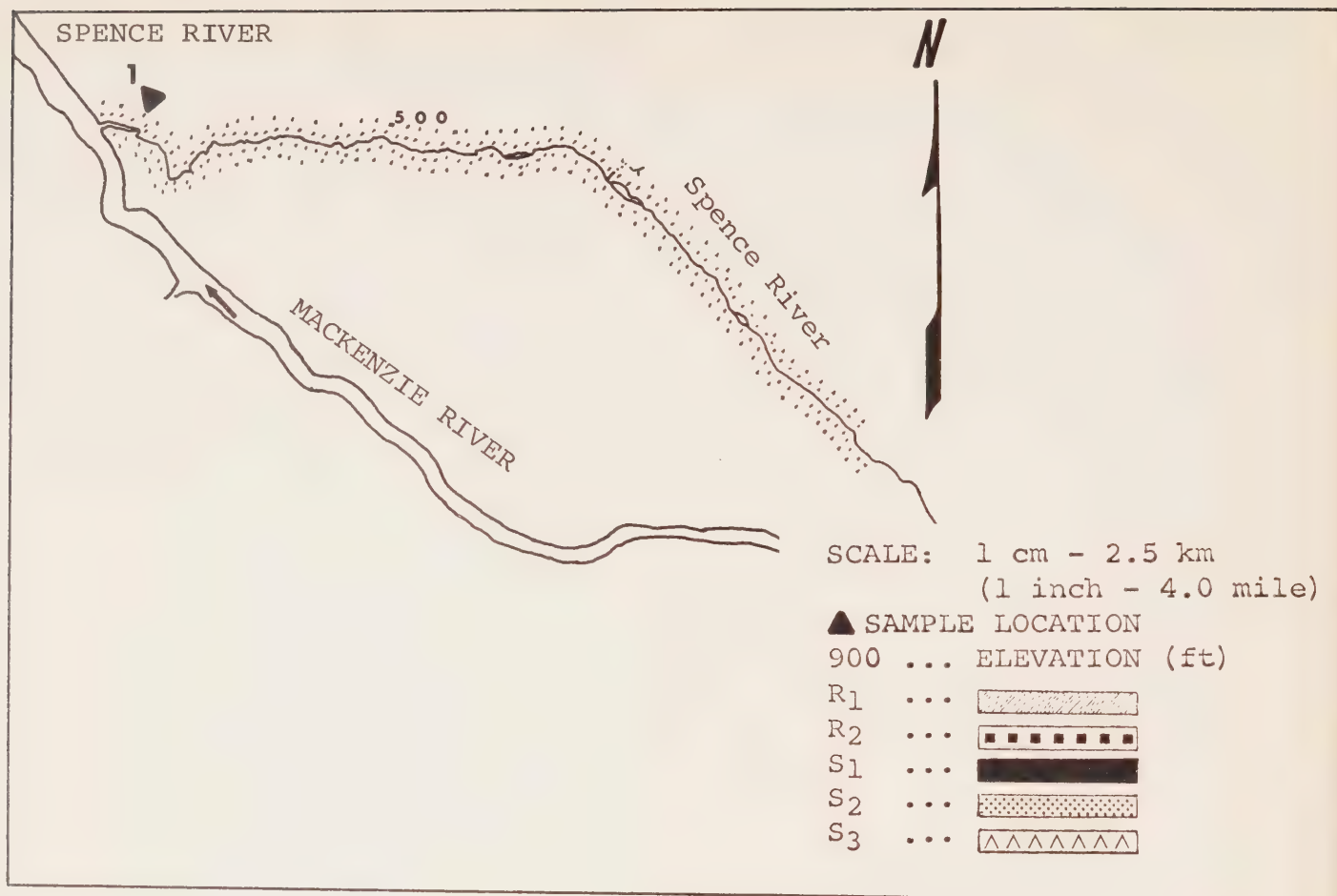
The Rabbitskin River supports a small sport fishery for northern pike, Arctic grayling and yellow walleye. Anglers are predominantly from Fort Simpson and Jean-Marie.

Sample Location Data: Rabbitskin River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71			24				
June 06	gravel	dark rust	21	angling seine	walleye lake chub pike longnose sucker	1 23 1 1	mature immature immature immature
#2-71			24				
June 06	gravel	dark rust	21	negative			
#2-71			26				
July 26	gravel	light rust	17	seine	pike	2	immature
#2-71			22				
Aug. 28	gravel boulders	dark rust	17	observed	pike	1	immature

RABBITSKIN RIVER Cont'd.

The Rabbitskin River was not sampled in 1972 by the synoptic survey due to the establishment of an intensive stream survey in this river (Jessop et al., 1973).



SPENCE RIVER

Total length 43 miles; drainage area 218 sq miles.

Watercourse Type

This is a multi-channeled marshy creek. Bog conditions extend the entire length of the river. Beaver dams and debris jams are extremely common and result in the river being almost stagnant.

Riverbank Conditions

Because of the extreme bog conditions the entire river is classified as S₂. Construction operations within this area would probably be much more hazardous to structure stability than to the river system.

Flow Conditions

Date: 01-06-72

Location: throughout river length.

Observable flow is non-existent, conditions are stagnant.

Assessment of the Fish Resources

The lower reaches of the Spence River are utilized for spring spawning by northern pike, Arctic grayling and longnose sucker. No runs of fall spawners have

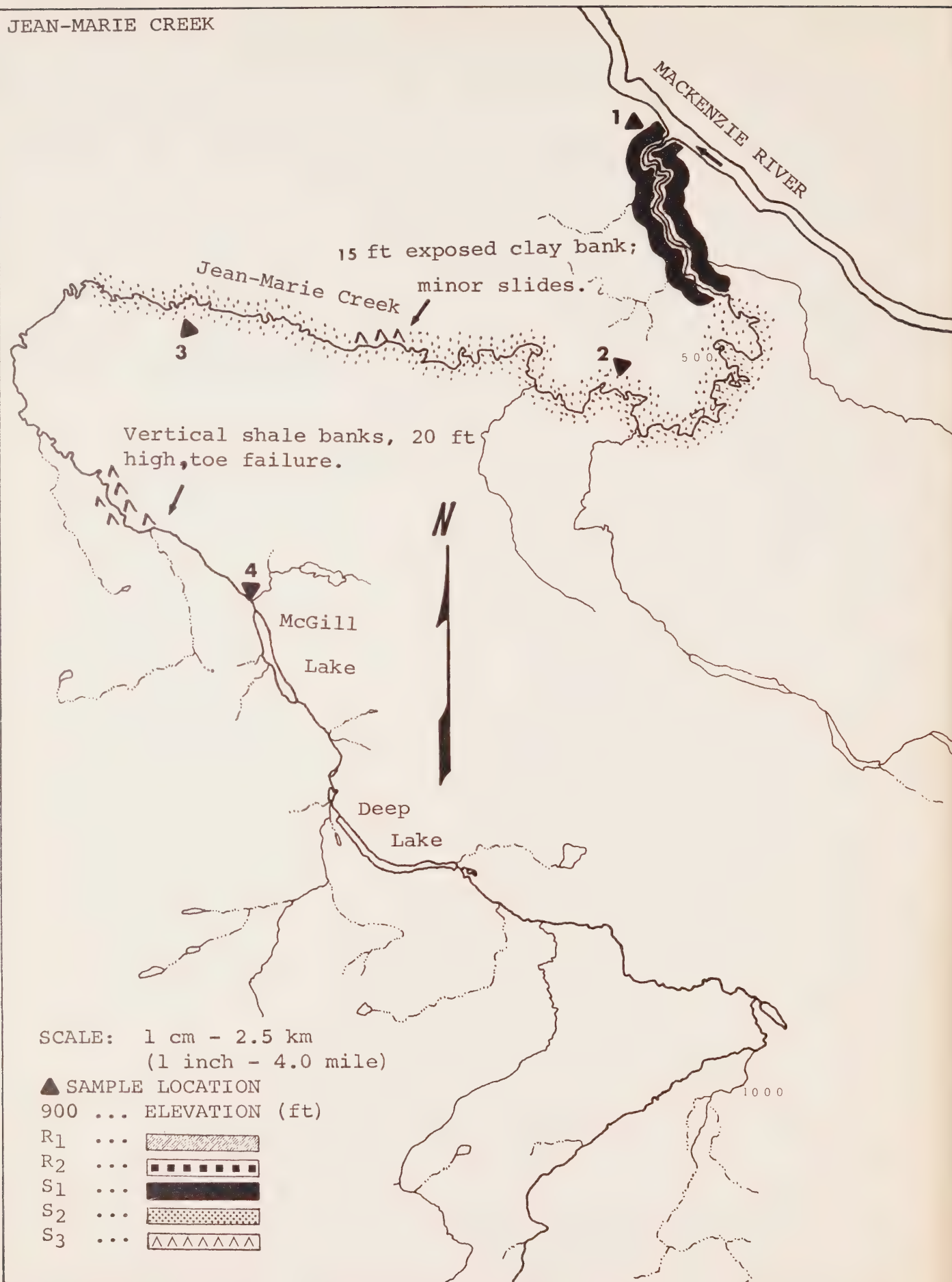
Assessment of the Fish Resources Cont'd

been detected. The river also serves as a nursery area for the above fish species. The occurrence of beaver dams on the river perhaps restricts fish movement upstream. Consequently only the very lower reaches would be utilized for spawning and nursery areas. Periodic domestic fishing takes place at the river mouth.

Sample Location Data: Spence River

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#1-71 June 22	unclassified	clear	24 21	seine	pike	14 immature
#1-72 May 25	coarse gravel	clear	13 8	gill net	pike	4 ripe and spent
					longnose sucker	2 mature
#1-72 June 01	gravel	clear	14 8	angling	pike	2 ripe

JEAN-MARIE CREEK



JEAN-MARIE CREEK

Total length 157 miles; drainage area 1,933 sq miles.

Watercourse Type

This is a single channel, sand bed, non-mountain and non-lake control river. The middle reaches of the river display extremely unstable meander. Oxbow lakes and recent cut-offs are quite common. There was very little gravel observed within this river.

Riverbank Condition

The lower 6 miles of riverbank are almost level with the water surface. The surrounding terrain is similarly of low profile.

The reach from the 6 mile mark to approximately the 40 mile mark is classified as S₂ because of the very heavy river meander. Results of this heavy meander are undercut banks, tree falls and oxbow lakes. The river in this section is approximately 40 to 50 feet wide with a total meander belt width of approximately 500 feet.

The S₃ regions are detailed on the map.

Flow Conditions

Date: 01-06-72

Location: At approximately the 25 mile mark.

Estimated Width : 40 feet

Estimated Depth : 3 to 4 feet

Estimated Current : 4 fps

Q = 600

Assessment of the Fish Resource

Spring runs of yellow walleye, sucker spp., northern pike, and Arctic grayling into the lower reaches of Jean-Marie Creek are indicated by catch results. A fall run of whitefish spp. was also detected. Yellow walleye and Arctic grayling fry captured upstream of the mouth during June indicate a strong possibility of spawning beds here. The river mouth is fished domestically by residents of Jean-Marie settlement from spring to fall.

Catch results on Jean-Marie Creek near McGill Lake indicate downstream movement of ripe northern pike, yellow walleye and longnose suckers in May and June. Spawning is likely to occur in the upper reaches of Jean-Marie Creek.

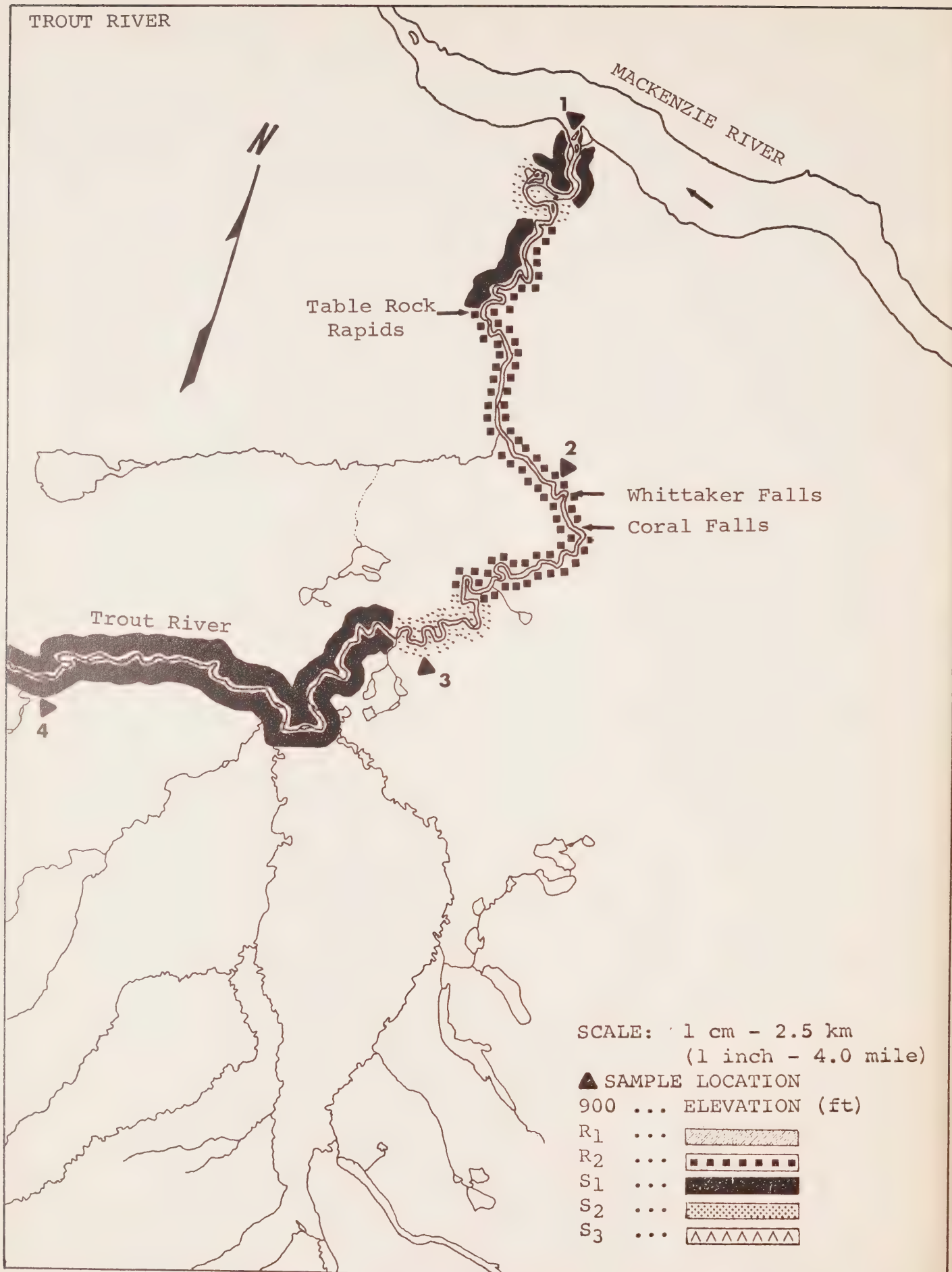
Sample Location Data: Jean Marie Creek

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 June 19	boulders	clear	19 21	angling gill net	pike walleye	4 4	mature mature
#2-71 June 19	gravel	light rust	19 18	seine	negative		
#2-71 July 23	boulders	clear	17 15	seine	negative		
#2-71 Aug. 28	boulders	clear	20 16	seine	negative		
#2-72 May 25	gravel shale	heavy silt	13 7	seine	lake chub	5	mature
#2-72 June 01	boulders coarse gravel	dark rust	15 11	seine	longnose sucker slimy sculpin	1 1	immature mature
#3-72 June 01-72	coarse gravel	light rust	15 9	gill net	pike	2	ripe and immature
#4-72 May 03	coarse gravel boulders	clear	10 4	seine	negative		
#4-72 May 12	unknown (at lake)	clear	10 4	angling	negative		
#4-72 May 25	unknown (at lake)	clear	12 7	gill net	pike walleye white sucker	12 2 1	ripe and immature ripe and spent ripe
#4-72 May 31	unknown	clear	15 9	gill net	pike longnose sucker	5 9	spent ripe

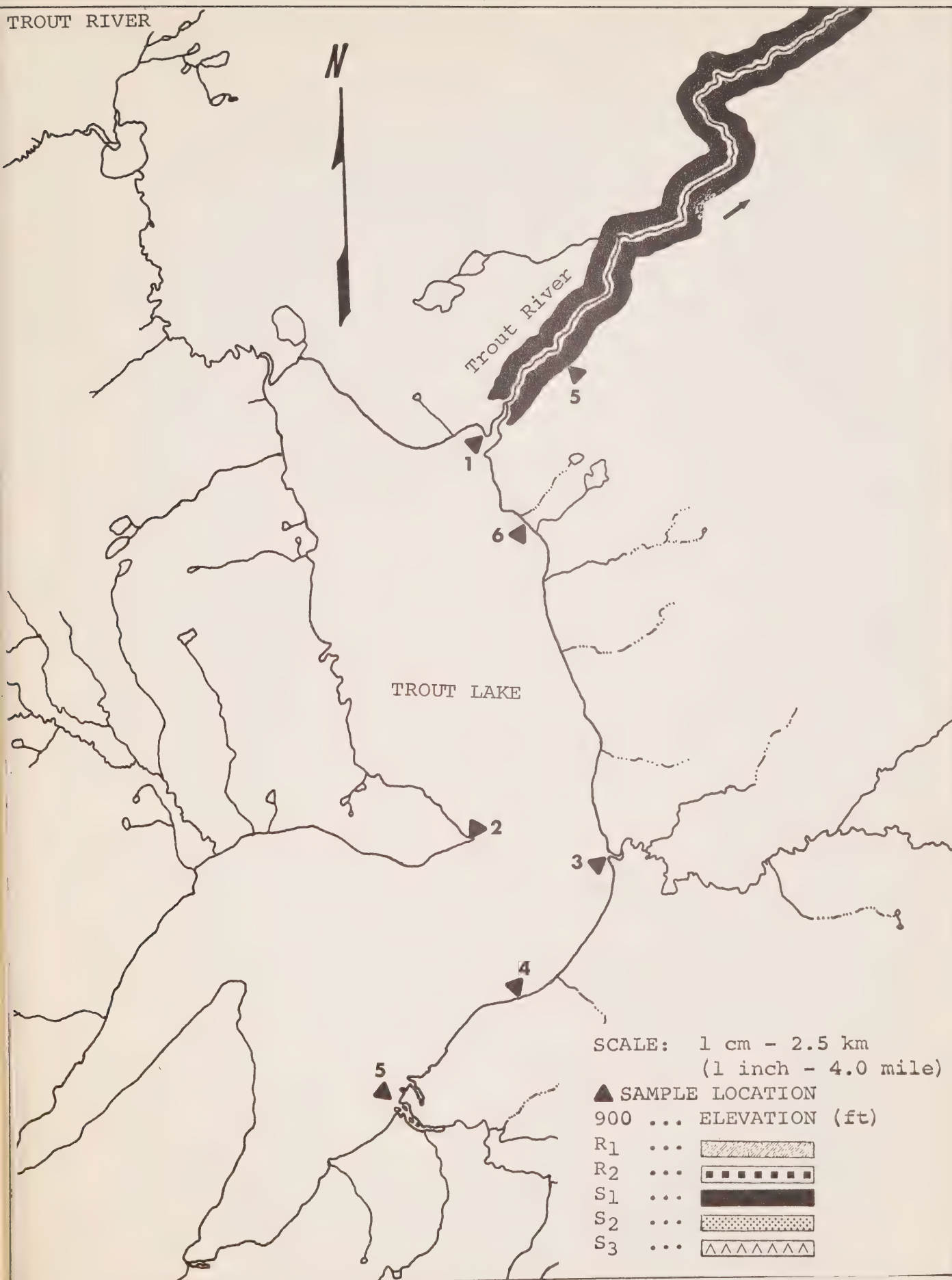
Sample Location Data: Jean Marie Creek Cont'dSample Location Water Chemistry

Location 2	Dates: 25-05-72	01-06-72
Temperature (C): Air-Water;	13;7	15;11
Dissolved Oxygen (D.O.);	9ppm	9ppm
pH:	8.0	8.0
Alkalinity: Total (CaCO ₃);	102.6ppm	102.6ppm
Hardness : Total (CaCO ₃);	102.6ppm	119.7ppm

TROUT RIVER



TROUT RIVER



TROUT RIVER

Total length 171 miles; drainage area 5,084 sq miles.

Watercourse Type

This is a single channel, non-mountain river. The upper reaches flow through a flat muskeg terrain while the middle and lower portions are deeply entrenched in bedrock. Waterfalls and rapids show the river to be in a youth stage (i.e. river is classified as mature only when it has completed its phase of rapid downcutting and has prepared itself a smoothly graded course). The river bed material is primarily gravel, progressing to boulders near the outlet of Trout Lake.

Riverbank Conditions

The lower 2 to 3 miles of river, plus the portion from approximately the 26 mile mark to Trout Lake, have low or level banks (with short sections of 5 foot to 10 foot banks) and a controlled meander.

From approximately the 5 mile mark to the 24 mile mark the Trout River occupies the bottom of a deep, steep-walled rock gorge. The depth of this gorge progresses from 60+ feet near the downstream end to 150 to 200 feet just downstream of the waterfalls. Throughout this section of river, much weathered rock material falls into the river. Slides and rock falls are common. The two major waterfalls, Whittaker and Coral, are 47 feet and 17 feet high respectively.

The S₂ regions preceeding and following the gorge region consist of 15 foot to 30 foot clay and shale banks on a slope of 40° to 50°.

Flow Conditions

Date:	30-05-72
Location:	Approximately the 42 mile mark
Estimated width:	100 feet
Estimated velocity:	2 fps
Estimated depth:	2 to 3 feet

The river width through its entire length varies between 75 feet and 150 feet.

Assessment of the Fish Resources

The Trout River is an excellent fish spawning and nursery river throughout much of its course from Trout Lake to the Mackenzie River. Upstream movement of fish species from the Mackenzie River is obstructed by Whittaker and Coral Falls, however the river below these falls serves as spawning and nursery areas for a number of fish species. Arctic grayling, northern pike, yellow walleye and longnose sucker appear to spawn in the lower reaches during May and June. Runs of fall spawners in the lower reaches have not yet been detected.

The Trout River from the falls region to Trout Lake also appears to

Assessment of the Fish Resources Cont'd-

possess spawning and nursery areas for a number of fish species. Northern pike and longnose sucker spawn in this stretch and it also serves as a nursery area for Arctic grayling. Movements of these species have not been determined and it is not known whether they are resident in the Trout River or migrate from Trout Lake.

Trout Lake contains most of the major fish species and is domestically fished by residents of the Trout Lake settlement. It is suspected that lake trout, northern pike, humpback whitefish and possibly yellow walleye utilize lake shallows close to shore for spawning. Domestic reports indicate there are spawning runs of yellow walleye, burbot, northern pike and longnose sucker up the Island River in the spring. Similar fish runs are reported up the river entering the north west corner of Trout Lake. Humpback whitefish apparently run up both these rivers in the fall to spawn and return to Trout Lake before freeze-up.

Sample Location Data: Trout River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 June 19	gravel	clear	16 14	seine	grayling pike	50 30	immature immature
#1-72 May 09	gravel	light silt	13 2	seine	negative		
#1-72 May 20	gravel	light silt	21 9	seine	lake chub longnose sucker slimy sculpin longnose dace	1 9 4 10	immature young of year immature immature
#1-72 May 30	gravel	dark rust	20 14	gill net	longnose sucker pike humpback whitefish walleye	3 3 1 3	ripe and spent ripe and spent mature spent
#1-72 May 30	gravel	dark rust	20 12		longnose sucker	1	immature
#2-72 May 20	gravel	clear	--		angling		negative
#2-72 May 30	gravel	clear	--		angling		negative

Sample Location Data: Trout River Cont'd

Location Data			Temp.	Fish Data		
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	# Maturity
#3-71 June 19	gravel	clear	12 14	angling	negative	
#3-71 July 27	gravel	clear	25 20	seine	grayling longnose sucker lake chub	2 immature 2 immature 2 immature
#3-71 Aug. 28	gravel	clear	17 18	seine	negative	
#3-72 May 09	gravel	clear	20 2	seine	white sucker	1 immature
#3-72 May 30	gravel	clear		angling	negative	
#4-72 May 30-72	gravel	clear	20 13	gill net	pike	8 spent and ripe
					longnose sucker	1 spent
#5-71 July 27	gravel	clear	30 19	seine	longnose sucker grayling	7 immature 1 immature
#5-71 Aug. 23	gravel	clear	21 16	seine	longnose sucker lake chub longnose dace	160 immature 16 immature 4 immature

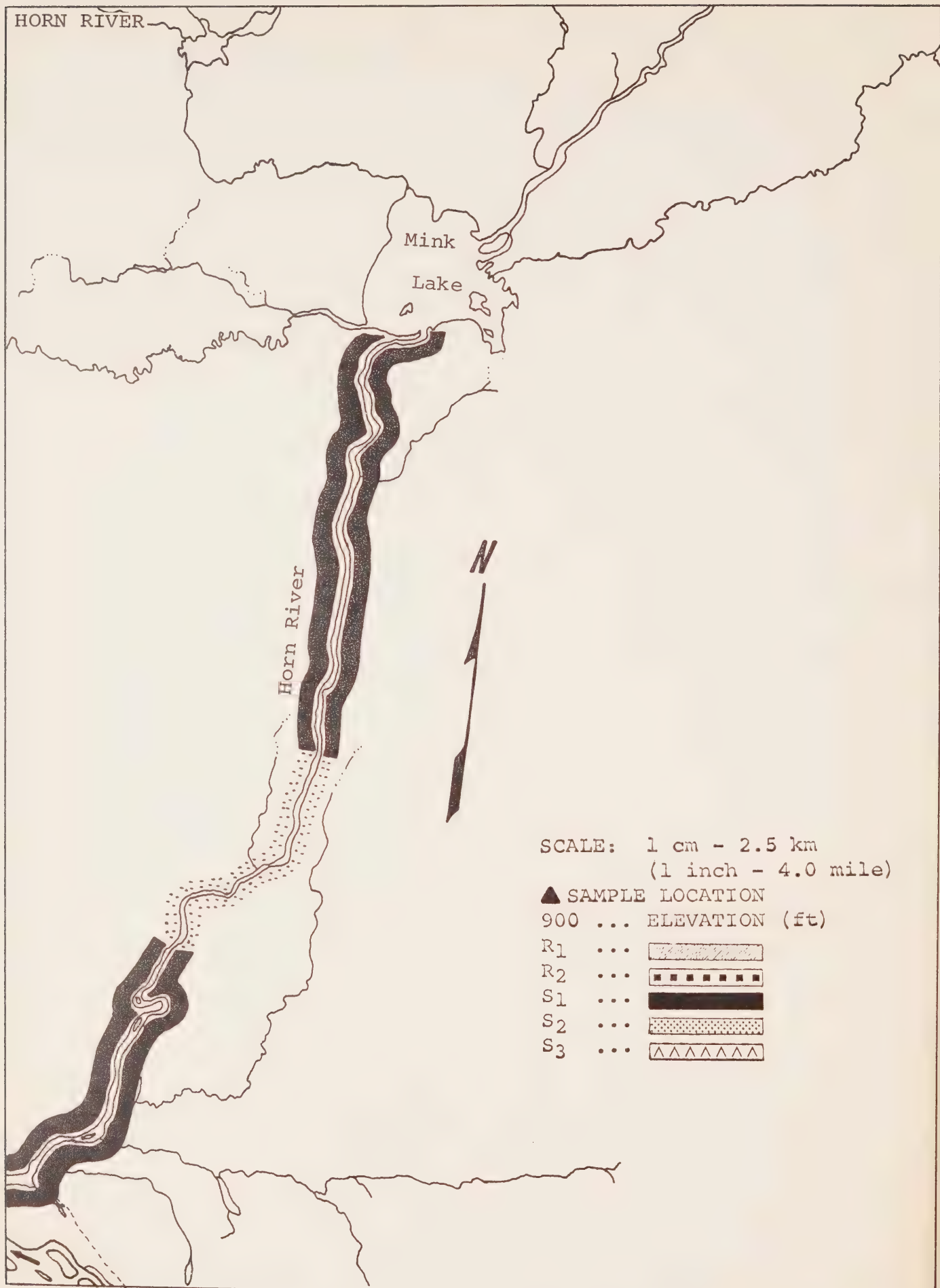
Location 5 not sampled in 1972.

Sample Location Water Chemistry

Location 1	Dates: 09-05-72	20-05-72	30-05-72
Temperature (C): Air-Water:	13;2	21;9	20;12
Dissolved Oxygen (D.O.):	16ppm	9ppm	10ppm
pH:	8.0	8.0	8.5
Alkalinity: Total (CaCO ₃):	119.7ppm		102.6ppm
Hardness : Total (CaCO ₃):		85.5ppm	85.5ppm

Sample Location Data: Trout Lake

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 Aug. 24	gravel sand	clear	17 16	gill net	humpback whitefish	1	mature
#1-72 May 30	gravel sand	clear	20 8		negative		
#2-71 Aug. 24	boulders gravel	clear	17 16	gill net	pike	4	mature
					walleye	1	mature
					humpback whitefish	2	mature
#3-71 Aug. 25	boulders sand	clear	16 17	gill net	longnose sucker	1	mature
					round whitefish	2	mature
					lake trout	5	mature
#4-71 Aug. 24	fine gravel sand	clear		seine	longnose sucker	1	immature
					humpback whitefish	8	immature
					walleye	12	immature
#5-72 May 08	unknown	clear	--	native gill net	walleye	10	ripe
					lake trout	6	mature
					longnose sucker	5	mature
					humpback whitefish	6	mature
					pike	1	mature
					burbot	2	mature
#6-72 May 20	gravel	clear	20 8	seine	negative		
#6-72 May 21	gravel sand	clear	20 8	angling gill net	pike pike	3 6	ripe ripe



HORN RIVER

Total length 247 miles; drainage area 7,393 sq miles.

Watercourse Type

This is a single channel, sand bed river, flowing across very low terrain. The many small lakes and marsh areas may act to control flood flows slightly. A series of riffles or rapids occurs within the middle reaches of the river. During early summer the head difference through each set of rapids is small, approximately 6 inches. Few areas of gravel were sighted but submergent vegetation is common in many areas from the Mackenzie River to Mink Lake. Pre-break-up observations in May indicate the river may freeze to the bottom in some areas.

Riverbank Conditions

During the time of visit, the river was at bank full stage, therefore it was difficult to assess actual riverbank conditions. It should be sufficient to state that this river is very wide through most of its length, and flows through a very flat terrain. At both the river mouth and at the outlet of Mink Lake the river is between 400 feet and 500 feet wide. Through the section of rapids the width is reduced to approximately 70 feet.

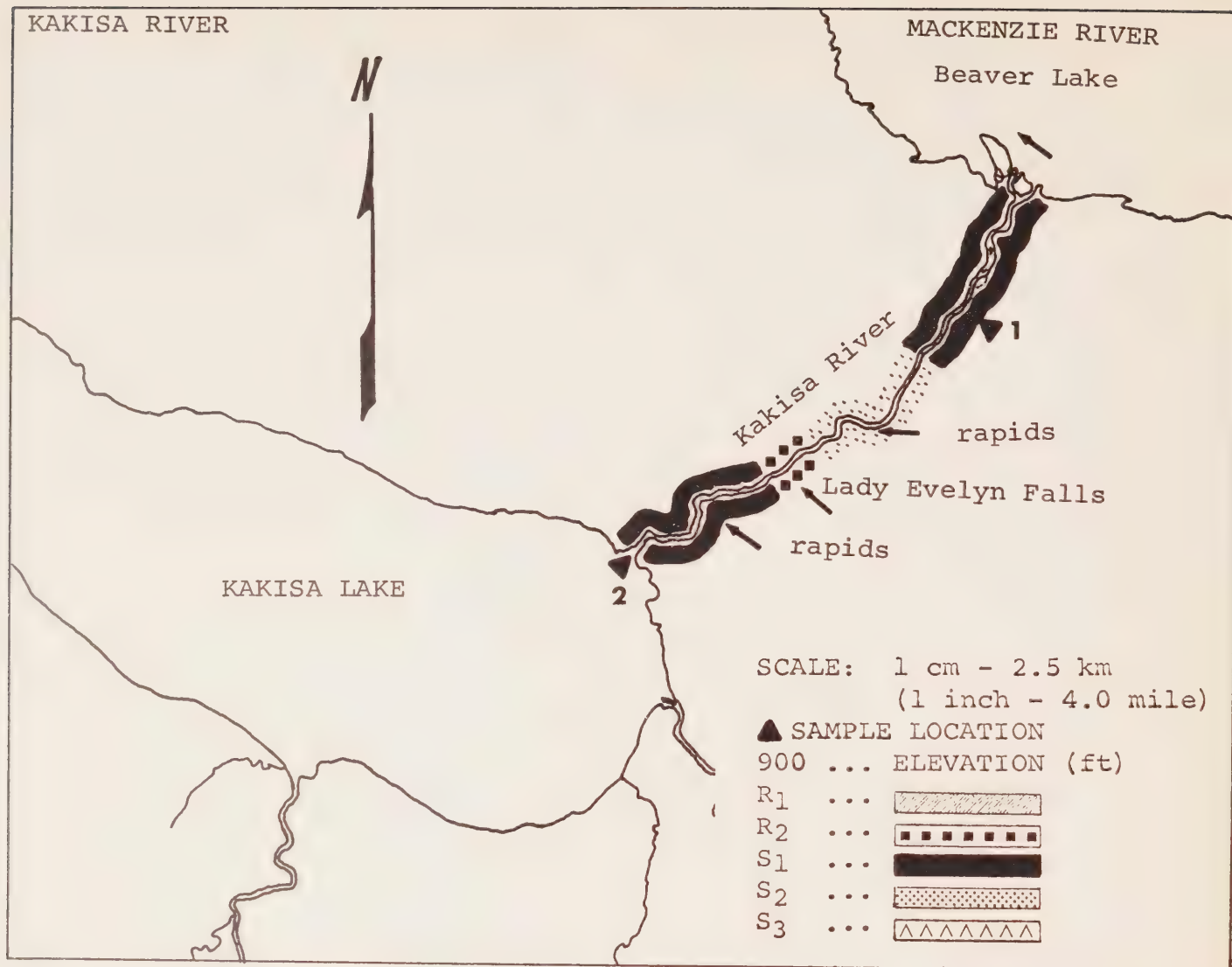
The short section of S₂ bank conditions occurs from the 12 mile mark to the 16 mile mark. Within this region the river banks are higher than normal (30 feet) and exhibit mud flows and tree falls.

Flow Conditions

Impractical due to high water and large river width.

Assessment of the Fish Resource

Fisheries information on the Horn River is based on reports from the domestic fishery on Mills Lake (Mackenzie River) and at the Horn River mouth. Principal species caught at the river mouth are yellow walleye, northern pike, sucker spp. and whitefish spp. A run of whitefish spp. into the river is reported in September with these fish returning downstream prior to freeze-up.



KAKISA RIVER

Total length 308 miles; drainage area 600 sq miles.

Watercourse Type

This is a single channel, lake controlled river. The areas of Tathlina Lake and Kakisa Lake are large enough to exert a dampening effect on Kakisa River flood discharges. Fine gravel and clear water are prevalent throughout the reach from the Mackenzie River to Lady Evelyn Falls.

From the falls to Kakisa Lake the river bed is mainly plated limestone and shale.

The river flows from Kakisa Lake through two major sets of rapids about 6 feet to 10 feet each and then drops 48 feet over Lady Evelyn Falls. Total drop from Kakisa Lake to the bottom of the falls is roughly 100 feet. Below the falls the river cascades over two more sets of shallow rapids and finally empties into Beaver Lake some 10 miles below Lady Evelyn Falls. Total drop from Kakisa Lake to Beaver Lake is about 216 feet (Northern Canada Power Commission, 1972.)

Riverbank Conditions

The river banks on this river are generally low to the water and very heavily treed. The surrounding terrain also has a low approach slope.

The only area exhibiting signs of instability was from Lady Evelyn Falls to approximately 4 miles downstream. At the falls the limestone cliffs show signs of fracture, rock falls and subsurface flow. The 4 mile stretch downstream is a downward progression of riverbank height and slope until stable conditions are encountered.

Flow Conditions

Mainly continuous records have been kept since September 1963 to the present with a recording gauging station located at the outlet of Kakisa Lake. The mean discharge over six years was 1,555 cfs for the 577 square miles drainage area. Maximum instantaneous discharge recorded was 7,140 cfs and minimum daily discharge was 230 cfs. (N.C.P.C. 1972)

Assessment of the Fish Resources

The Kakisa River, from Lady Evelyn Falls to the Mackenzie River is a spawning area for northern pike, Arctic grayling, yellow walleye and longnose sucker. This is based upon results of a Fisheries Management creel census conducted from May 23, 1972 to June 20, 1972 at Lady Evelyn Falls. Ripe and spent fish of these species were captured by anglers below the falls. Possible runs of fall spawning species have not been defined although whitefish have been caught in the river. Kakisa Lake is commercially and domestically fished by natives of the Kakisa Lake settlement.

Sample Location Data: Kakisa River

Location Data			Temp.	Fish Data			
Loc. # & Date	Bottom Type	Colour	Air Water (C)	Catch Method	Species	#	Maturity
#1-71 June 18	gravel	clear	18 20	angling	grayling	3	mature
#1-72 May 29	gravel	clear	27 9	angling	grayling	1	mature
#2-72 May 29	gravel	clear		seine	ninespine stickleback trout-perch spottail shiner longnose sucker	4 2 4 1	mature immature mature immature

Sample Location Data: Kakisa River Cont'dSample Location Water Chemistry

Location 1

Date: 29-05-72

Temperature (C): Air-Water: 27;9

Dissolved Oxygen (D.O.): 10ppm

pH: 8.5

Alkalinity: Total (CaCO_3): 136.8ppmHardness : Total (CaCO_3): 171ppm

6. LITERATURE CITED

- Church, M. 1971. Reconnaissance of hydrology and fluvial characteristics of rivers in the Mackenzie Valley, Northwest Territories and in Northern Alberta. Report for Mackenzie Valley Pipe Line Research Ltd. 53 p.
- Crippen, G.E. and Associates Ltd. 1972. Great Bear River Investigation, Engineering Report. Report for Northern Canada Power Commission.
- Hatfield, C.T., J.N. Stein, M.R. Falk, C.S. Jessop and D.N. Shepherd. 1972. Fish resources of the Mackenzie River Valley, Interim Report I, Vol. 2. Department of the Environment, Fisheries Service, Winnipeg, Manitoba. 289 p.
- Isaacs, R.M. and J.A. Code. 1971. Problems in engineering geology related to pipeline construction. 30 p.
- Jessop, C.S., T.R. Porter, M. Blouw and R. Sopuck. 1973. Fish resources of the Mackenzie River Valley, Interim Report II. Special report, an intensive study of the fish resources of two main stem tributaries. Department of the Environment, Fisheries Service, Winnipeg, Manitoba.
- Northern Canada Power Commission, 1972. Kakisa River power development proposal outline. 4 p.
- Stein, J.N., C.S. Jessop, T.R. Porter and K.T.J. Chang-Kue. 1973. An evaluation of the fish resources of the Mackenzie River Valley as related to pipeline development. Vol. I. Department of the Environment, Fisheries Service, Winnipeg, Manitoba.

7. APPENDIX

List of common names and associated generic names for Mackenzie Valley fish species.

Arctic char - Salvelinus alpinus (Linnaeus)
 Arctic cisco - Coregonus autumnalis (Pallas)
 Arctic grayling - Thymallus arcticus (Pallas)
 Arctic lamprey - Lampetra japonica (Martens)
 Boreal smelt - Osmerus eperlanus (Linnaeus)
 Broad whitefish - Coregonus nasus (Pallas)
 Brook stickleback - Culaea inconstans (Kirtland)
 Burbot - Lota lota (Linnaeus)
 Chum salmon - Oncorhynchus keta (Walbaum)
 Dolly varden - Salvelinus malma (Walbaum)
 Emerald shiner - Notropis atherinoides (Rafinesque)
 Finescale dace - Pfrille neogaea (Cope)
 Flathead chub - Platygobio gracilis (Richardson)
 Goldeye - Hiodon alosoides (Rafinesque)
 Humpback whitefish - Coregonus clupeaformis (Mitchill)
 Inconnu - Stenodus leucichthys nelma (Pallas)
 Lake chub - Couesius plumbeus (Agassiz)
 Lake cisco - Coregonus artedii (LeSueur)
 Lake trout - Salvelinus namaycush (Walbaum)
 Least cisco - Coregonus sardinella (Valenciennes)
 Longnose dace - Rhinichthys cataractae (Valenciennes)
 Longnose sucker - Catostomus catostomus (Forster)
 Mountain whitefish - Prosopium williamsoni (Girard)
 Ninespine stickleback - Pungitius pungitius (Linnaeus)
 Northern pike - Esox lucius (Linnaeus)
 Northern redbelly dace - Chrosomus eos (Cope)
 Pond smelt - Hypomesus olidus (Pallas)
 Round whitefish - Prosopium cylindraceum (Pallas)
 Slimy sculpin - Cottus cognatus (Richardson)
 Spoonhead sculpin - Cottus ricei (Nelson)
 Spottail shiner - Notropis hudsonius (Clinton)
 Trout-perch - Percopsis omiscomaycus (Walbaum)
 White sucker - Catostomus commersoni (Lacepede)
 Yellow walleye - Stizostedion vitreum vitreum (Mitchill)

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